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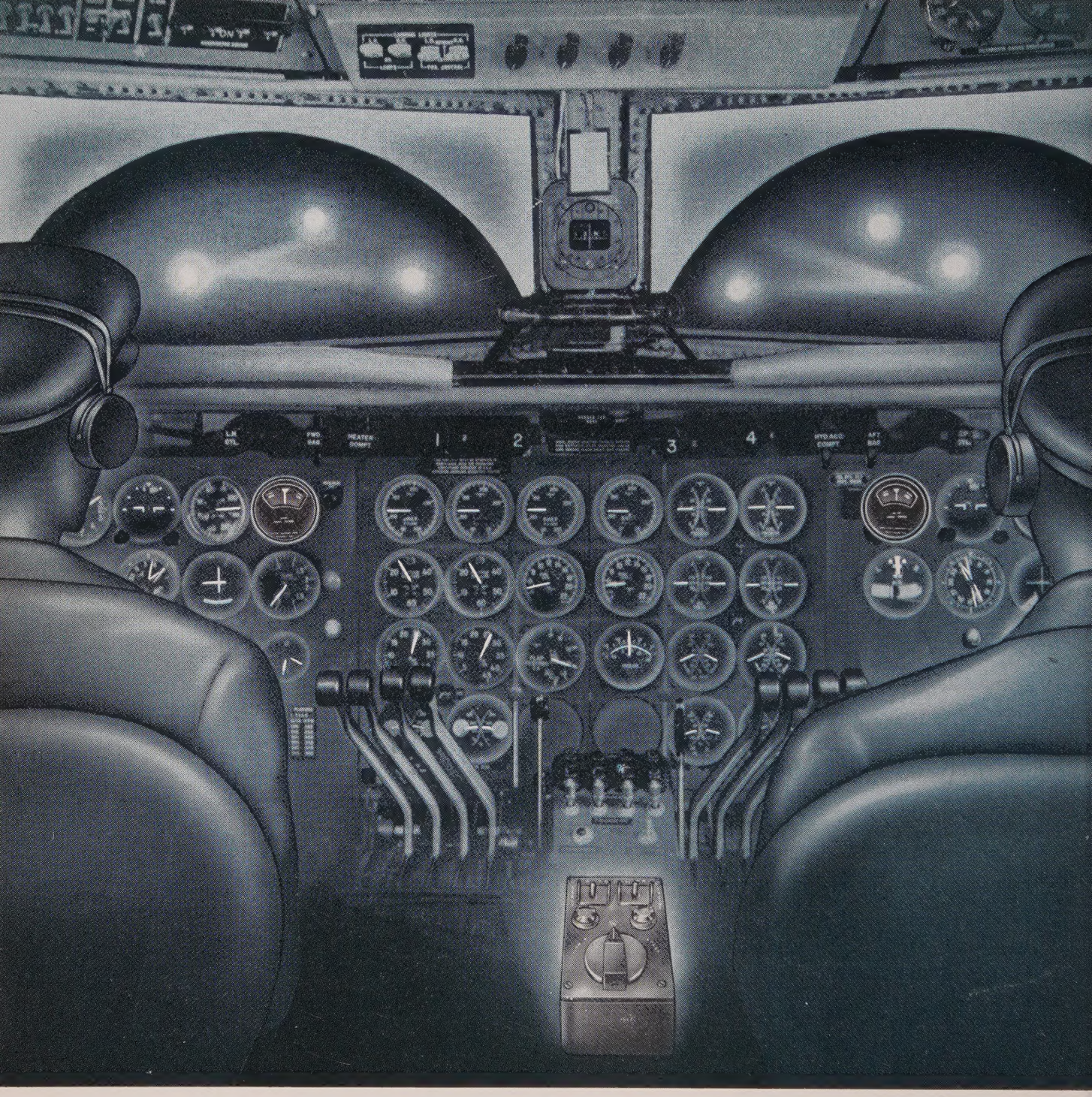

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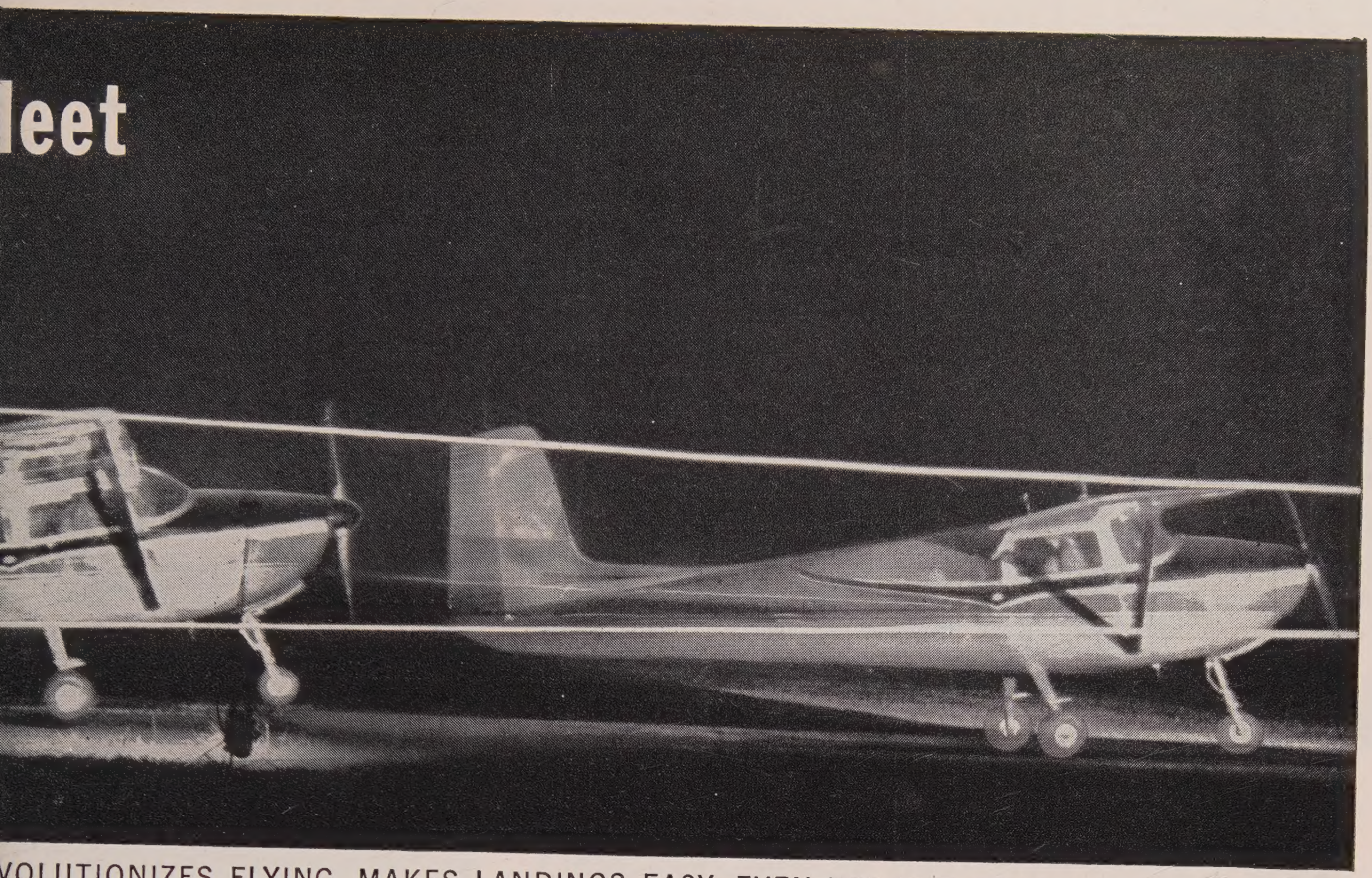

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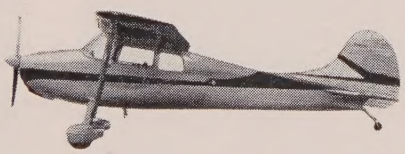

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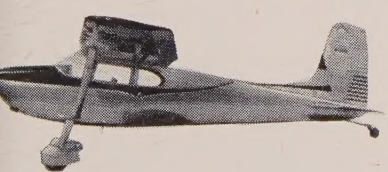

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APRIL, 1956

Skyways

The Pioneer Publication of Business Flying

COVER: One of Hercules Powder Company's Executive DC-3s

The Whirly-Bird as Air Traffic .... Arthur E. Graham 10

Metropolitan Air Lift ..... Capt. Jack Gallagher 12

Business Planes Save Time and Money ..... Jean H. DuBuque 13

Flight Operations Round Table: Aeronautical Communications Trends 14

NAVICOM

Burbank IFR Departures 21

Air Aids Spotlight 22

Flares for Night Landings 28

Now Hear This 8

Skyways For Business 18

NBAA Report 24

Fuels & Oils 30

Industry Notes 39

NU-AVI-QUIP 43

Washington Report 46

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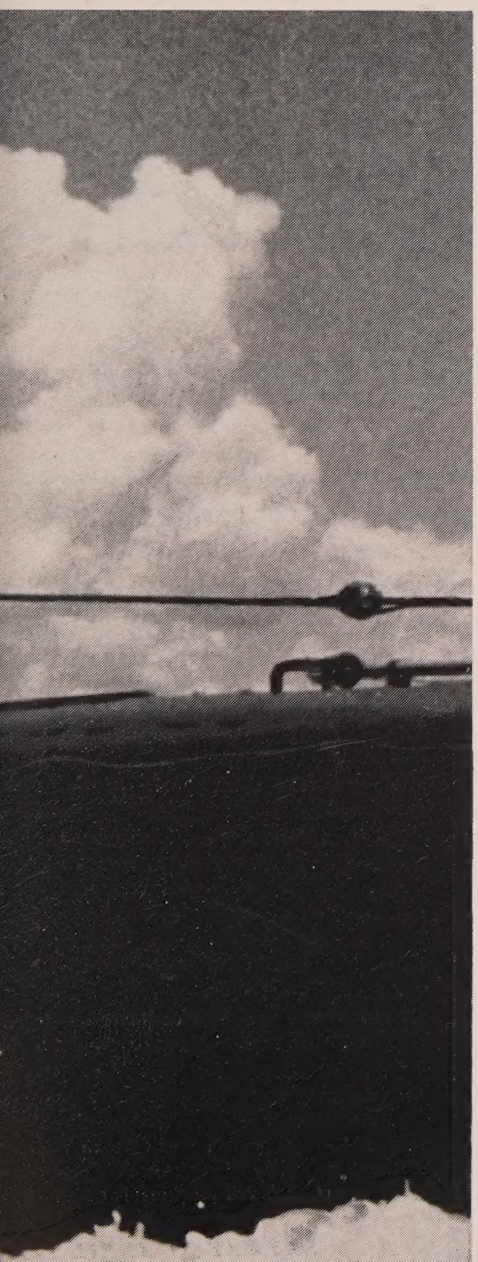
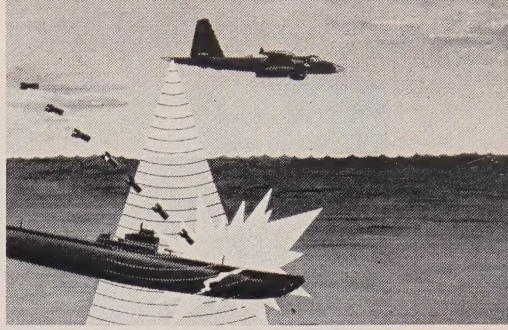
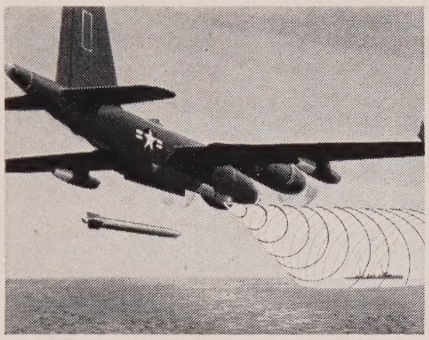
ive modifications of the P2V have kept it
arily up to date at lowest cost to the Navy.
d for pound, and dollar for dollar, the
Neptune is the most formidable patrol
aft bearing the insignia of the U.S. Navy.

ntly the Navy awarded Lockheed its *24th*
act for P2V *Neptunes*—a tribute to Lock-
's leadership in weapons system manage-
t, the development and application of
ronics, and the design and production of
range patrol aircraft.





These drawings illustrate the multiple-mission capabilities of the P2V *Neptune:* **1** Low-flying P2V's electronic gear spots submerged sub because its presence distorts the earth's magnetic field. **2** Depth-bombing a submerged sub, **3** torpedoing a surface ship or laying mines to disrupt enemy shipping are jobs the P2V can do equally well. **4** Spotting hurricanes and reporting their velocity and direction are routine but important P2V missions which save human lives and vast sums in property damage.



Lockheed Missile Research Laboratories to Be Built in Stanford's Industrial Park

A series of research laboratories will be constructed by Lockheed's Missile Systems Division on a 22-acre site adjacent to Stanford University, Palo Alto, California. On a nearby site of 275 acres, at Sunnyvale, Lockheed will build extensive new engineering, manufacturing and administration facilities. Lockheed's 3,000 scientists, engineers and technicians now developing guided missiles and unmanned aircraft at Van Nuys will transfer to Palo Alto and Sunnyvale as rapidly as construction permits.

The proximity of both new sites to Stanford will make the university's outstanding academic resources available to Lockheed research teams. And the new laboratory facilities to be built by Lockheed will provide Stanford scientists with technological tools and consulting opportunities hitherto unavailable.

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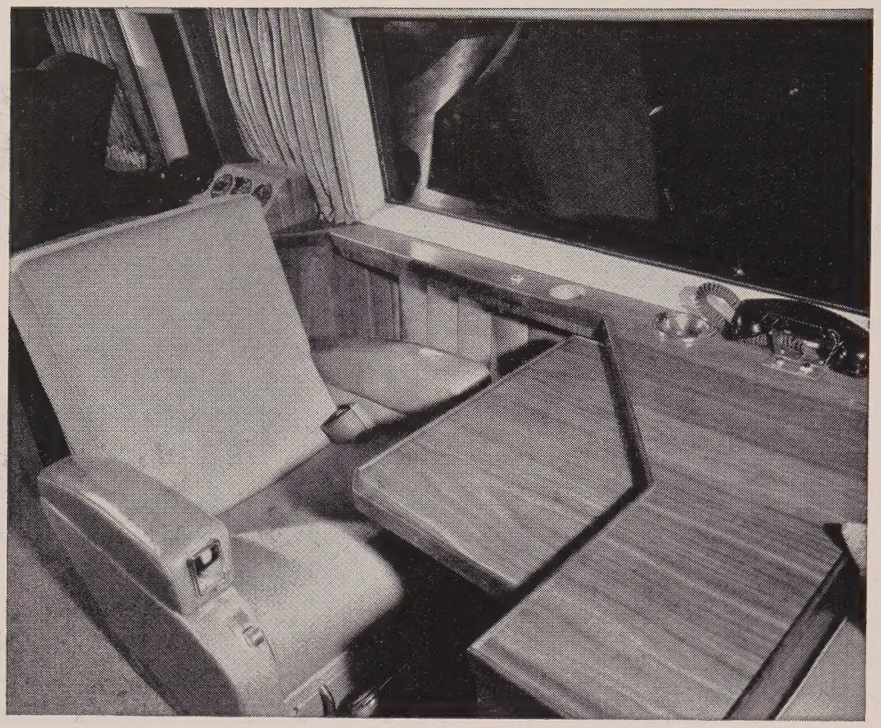
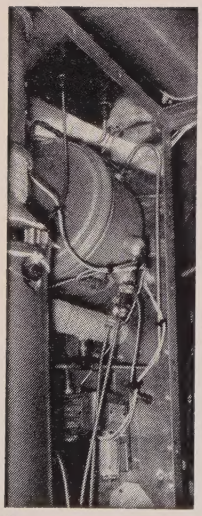


sky office with Janitrol heat



Executive Aircraft Service, Inc., Dallas, specifies Janitrol heaters for their conversions. In their one hundredth, pictured above, they used a unique tail installation. A standard "off the shelf" 200,000 BTU/hr Janitrol unit is located in the baggage section . . . making room for a forward commissary, yet using existing ductwork with little modification. In placing the heater aft, they capitalize on the DC-3's normal back-to-front ventilation flow.

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PERSONNEL

James B. Devine has been appointed manager-news services for American Airlines. He also was named editor of *Flagship News,* AA's employee publication.

Kenneth T. Casey recently was named district sales manager of GE's new Light Military Electronic Equipment Department office in Seattle, Wash.

James Allen, on the executive staff of Atlas Corporation for three years, has been named a vice president.

Edward C. Light has been elected a vice president of Summes Gyroscope Co.'s newly formed Research and Quality Division and member of the board of directors.

Raymond O. Fradette has been appointed assistant director of research for Cook Research Laboratories, a division of Cook Electric Company.

Joseph J. Langford recently was appointed manager of Air Force contracts for Kollsman Instrument Corp.

Dr. Wallace G. Caldwell, chief engineer of the Red Bank division of Bendix Aviation Corp. for four years, has been named to head a new department for transistor research and production.

Thomas L. Norton has been appointed assistant plant manager of TEMCO's Garland plant.

William G. Baker recently was named Los Angeles field representative for the aircraft division of General Controls Co.

W. A. Patterson, president of United Air Lines, was elected a director of Goodyear Tire and Rubber Co. recently.

Dan Jacobson, chief aerodynamist of Aeroproducts Operation, Allison Division of GM, has been appointed chairman of the propeller sub-committee of NACA.

Donald W. Irwin, formerly with McDonnell Aircraft Corp. and Curtiss-Wright, has been appointed assistant chief design engineer for Weston Hydraulics, Ltd., a subsidiary of Borg-Warner Corp.

Orin Redhead has been named Eastern regional sales manager for LearCal Div.

Ben J. Cumnock, aircraft and engine specialist for The Texas Co. for nine years, has been named vice president of operations for Dallas Aero Service.

Dr. D. B. Duncan recently was appointed assistant chief of the guidance section of North American Aviation's Autonetics Div.

John C. Pennock has been named sales manager of Flight Research, Inc.

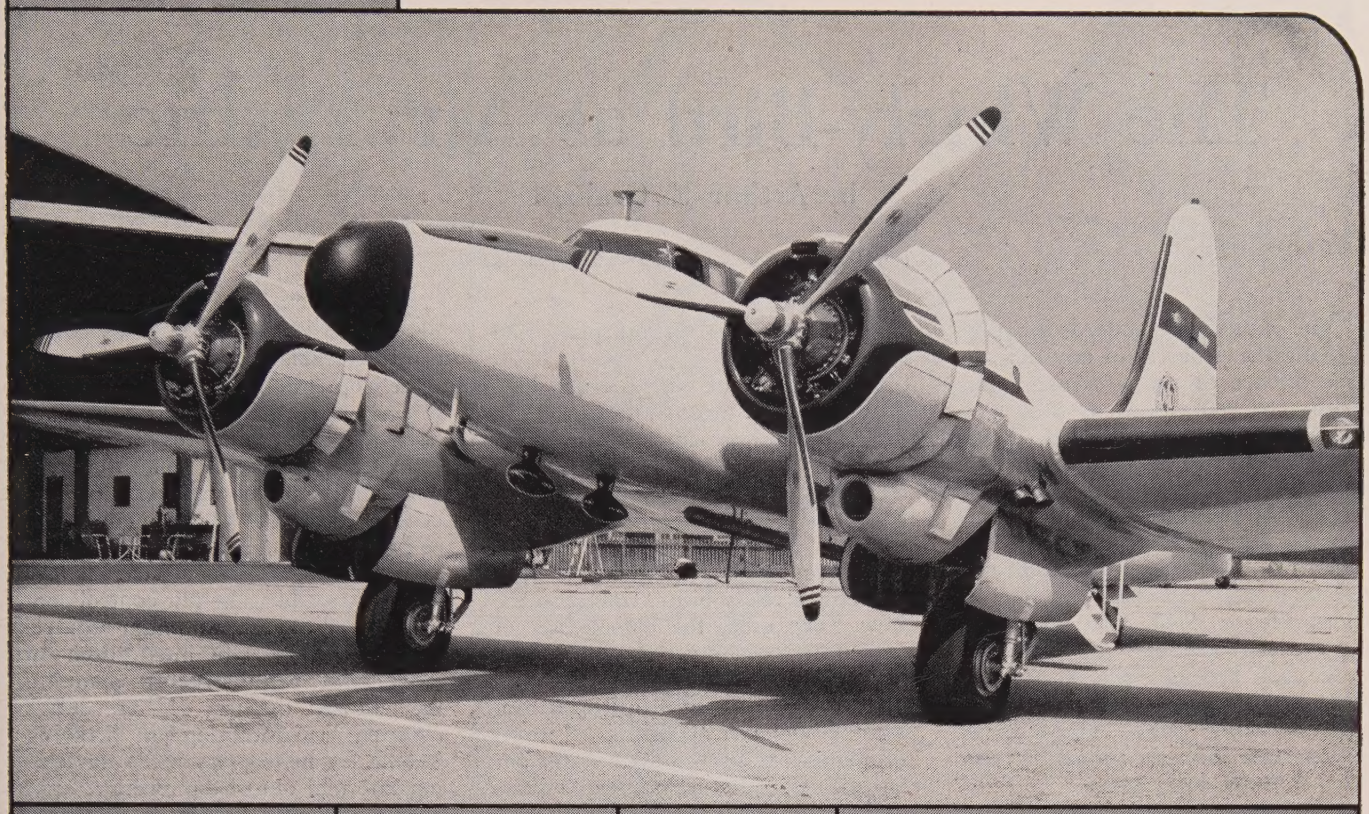
Clarence B. Knudson has been appointed director of the new product and applications design section of Marvelco Electronics Div. of National Aircraft Corp.

B. W. Dudley, general manager of Curtiss-Wright propeller division, has been elected a vice president of the corporation.

Col. William E. Hinton has been named manager of Chrysler Corp.'s internal Air Transport Service. Headquartered at Detroit City Airport, he will be in charge of the corp.'s fleet of aircraft.

(*Continued on page* 47)

INSTALLATION RECORD



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DAVISON CHEMICAL COMPANY, Baltimore, Maryland
DIAMOND ALKALI COMPANY, Cleveland, Ohio
FOOD MACHINERY & CHEMICAL CORP., New York, N. Y.
THE GENERAL TIRE & RUBBER CO., Akron, Ohio
ARTHUR GODFREY, New York, N. Y.
IDEAL CEMENT COMPANY, Denver, Colorado
ISLAND CREEK COAL SALES COMPANY, Huntington, W. Va.
KEWANEE OIL COMPANY, Philadelphia, Pa.
KUDNER AGENCY, INC., New York, N. Y.
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The Whirly-Bird as Air Traffic

by Arthur E. Graham

Airways Operations Specialist, LaGuardia Tower

One of the best standards for judging the progress of any new device, science or art is casual public acceptance. Whenever, as time goes by, people stop turning their heads and continue with their own routine order of business, it may safely be stated that said new device has successfully "arrived."

So it is with most of our post-war developments, especially in the air transportation field. The mixing of conventional aircraft with helicopter traffic has become such a common sight at so many airports that the general flying public could easily assume that there are no major problems of traffic integration.

"Familiarity breeds contempt" is an old axiom. But the pedestrian jaywalker who glides and darts so indifferently through heavy traffic in downtown streets has few counterparts among the pilots and the air traffic controllers who must deal with the steadily growing problem of mixed helicopter—fixed wing traffic. That there have been few dramatic conflicts worthy of general public notice is a tribute to both pilots and controllers.

Although there have been helicopters flying through large metropolitan areas ever since the end of the war, their numbers were insufficient to warrant special attention until the advent of commercial helicopter operations. Los Angeles and Chicago started sooner, but in 1952 when such operations really began rolling in the New York area, the complexion of the future took on a rather unhealthy hue. The complexity and congestion of traffic in the New York area had already achieved a position of world supremacy. It threw a distinct damper on full use of the unique capabilities of the rotating-wing aircraft.

Responsible officials as well as industry people had watched the growth of helicopter traffic in other so-called hi-density areas, and there was little reason to suspect that the long established air traffic rules and criteria for separation of aircraft were inadequate. But the application of the old standards of separation in the New York area resulted simply in the addition of "aircraft" to the already overcrowded traffic picture. In the opinion of helicopter adherents, further growth of their operations will be halted unless standards are improved.

In CAVU or VFR conditions, the major brake on the expansion of helicopter movements has been communications. A tremendous overload on control frequencies existed before helicopters added the few control contacts found to be a minimum requirement for their safe integration. In other areas, route structure planning has allowed the use of "preventive control" (maintaining a listening watch) by helicopters while navigating into and out of the terminal area over flight paths designed to be free of conflict with fixed-wing approaches and climb-outs. Examination of the route structure maps and overlay diagrams reveals the impossibility of this solution in the New York area, and especially at LaGuardia.

Hi-density fixed-wing traffic conflicts, even in CAVU conditions, are already a major source of concern. Helicopters operating between Idle-

SOUTHEAST BOUND *to Idlewild, a New York Airways Sikorsky S-55 helicopter makes scheduled LaGuardia Airport takeoff. Note the proximity of the taxying DC-3 and parked aircraft. LaGuardia's active runway 13-31 is just below bottom of the picture.*

wild and LaGuardia along the Flushing Meadows route are hardly a comforting factor to heavy multi-engined aircraft pilots struggling for altitude over the Meadows after take-off from LaGuardia's runway 13 on a hot summer day. And they are no more so when pilots are letting down over the same route for landing in the opposite direction on runway 31. The 'copters are in the pilot's most sensitive blind spot!

Similarly, west and north departing and arriving helicopters crossing active runways in good weather conditions impose an additional load on controller personnel. They must apply standard separation criteria in maintaining a proper sequence of operations, and must time crossing movements to achieve the least penalty to fixed-wing traffic on the active runway. It is a tribute to the mutual confidence of both professional pilots and controllers that such operations have approached as close to the simultaneous as current separation criteria will allow.

Without breaching the recognized obligation of "no preferential handling," almost independent simultaneous control of helicopter traffic with fixed-wing traffic has been achieved in good weather. This is important because the short time segment nature of helicopter routes makes a traffic delay, insignificant to a fixed-wing aircraft, almost an economic disaster to the helicopter. It might be due at the first mail/passenger stop by the time it finally gets off the ground at the airport of origin!

The proximity to active runways of the current helicopter terminal pad at LaGuardia makes full 100% radio control a necessity. Hi-density period radio jamming, despite the utmost vocal dexterity on the part of the helicopter pilot, can prevent him from obtaining a clearance for some time from a harassed controller trying to separate a mixture of a dozen light and heavy aircraft using the nearby runway at a rate of a movement every thirty seconds!

If separation minimums could be reduced here, through acceptance by all parties concerned of the unique controllability of the helicopter, simultaneous operation in good weather over parallel flight paths determined to be non-conflicting might be one solution employing "preventive control" techniques. Currently, the Coast Guard has been authorized to operate their float-equipped 'copters "not over 100 ft. altitude" back and forth from the Hell Gate Bridge area via a channel north of Rikers' Island to the Whitestone Bridge. This route passes within two and three miles

CHART *shows some of overlap of helicopter and fixed-wing aircraft patterns at LaGuardia. Solid lines are fixed-wing paths. Note altitudes on dotted lines, the helicopter paths.*

respectively of and under commonly used takeoff and landing paths at LaGuardia. Being very hard to see at low levels against hazily viewed ground objects, their passage can often be unnoticed. Paradoxically, in CAVU conditions, an occasional pilot will comment on their presence to a controller already too hard pressed to maintain visual contact of his known traffic, much less to observe almost invisible traffic below the built-up horizon line.

So much for good weather conditions in which the 'copter is basically just another airplane to traffic control. Obviously, if the 'copter traffic is going to increase measurably, the normal restraints of traffic control will have to be eased by such techniques as "preventive control," separate routings with built-in separation from fixed-wing approach and takeoff patterns, and re-location of 'copter terminal pads. Also, if an easing of control restrictions in less than three mile visibility can be accomplished by these means, it may then become necessary for the 'copter operators to accept full responsibility for their own separation along these corridor routes down to a new visual minimum. Company traffic control on a company frequency may be the key to this. But what shall we do about the itinerant 'copter, which is just beginning to make its appearance and undoubtedly will increase in number rapidly?

In "marginal" conditions (visibility varying both sides of 3 miles and/or ceilings varying above and below 1000 feet) and in full IFR conditions, the special operating characteristics of the 'copter are still largely neglected because of traffic control considerations which hinge on current regulations. For instance, New York Airways has approval for operation substantially below so-called VFR limits. The company, however, has voluntarily curtailed operations in IFR conditions to prevent undue hardships on pilots and controllers. As a consequence, although helicopter movements in June 1955, a "good weather" month, were only 13.5% of all LaGuardia movements, the performance factor in that month was 87.6% primarily due to the above restrictions.

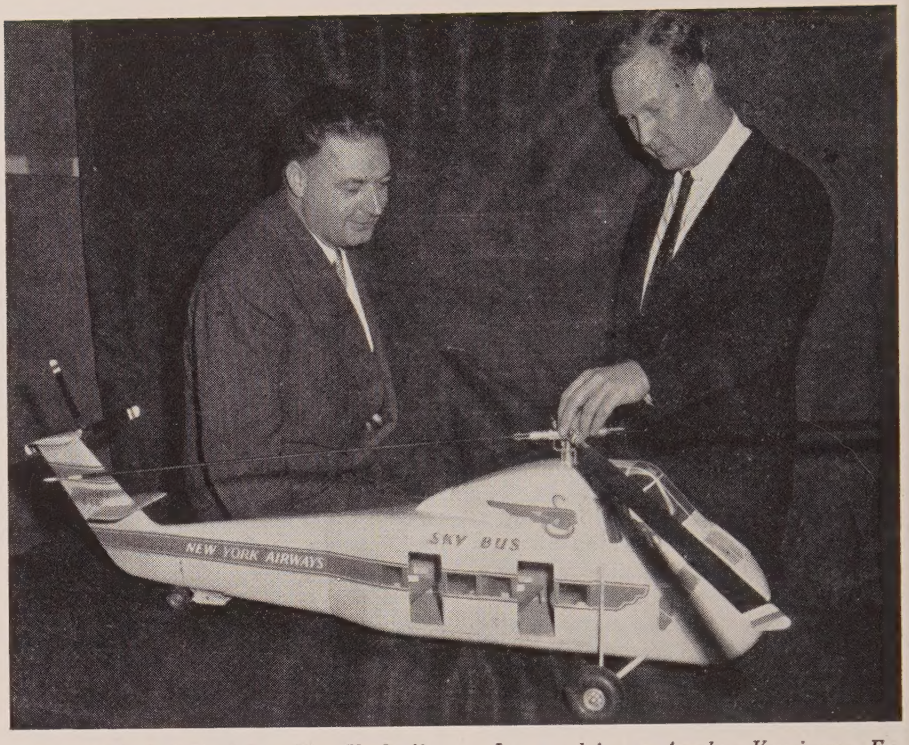
Current regulations require the same standards for helicopters as for fixed-wing aircraft when separation is indicated. As a result, controllers and pilots stretch their ingenuity to the limit to expedite 'copter traffic within

(*Continued on page* 42)

Metropolitan AIR LIFT

by Capt. Jack Gallagher

Chief of Operations of New York Airways, Inc.



CAPTAIN *Jack Gallagher of New York Airways, Inc., explains to Anselme Vernieuwe, Executive Vice President of Sebana, principles of S-58 Sikorsky 'Copters in their operations.*

The recent announcement by New York Airways of its decision to purchase a new fleet of helicopters not only spells an era of expansion for the vertical lift industry as a whole, but also caps an impressive list of "firsts" set by this organization in its brief three and a half year span. Delivery of the new fleet this spring will make NYA the nation's largest helicopter service operating on a regularly scheduled basis.

New York Airways was officially certificated in March 1952, and by October 1952 the New York metropolitan area saw the opening of the first helicopter mail service. This service proved so effective that Bridgeport, Conn., and 10 additional communities were added to the route by December of that same year. Cargo service on the mail routes was inaugurated in January 1953, and by June of that year the twice daily mail and cargo service was extended to Trenton, New Jersey, and a dozen intervening communities. July 8, 1953, saw one of the biggest steps of all—the first scheduled passenger helicopter service in the world. It linked LaGuardia, Idlewild and Newark airports.

The success of these ventures can be readily attested by the fact that in just over three years of operation, ever-increasing demand has sparked the purchase of a highly improved fleet that will more than double the passenger and weight capacity of the present one. The new fleet will consist of Sikorsky S-58's and represents an investment of over $2,000,000. The present model now used by New York Airways, the Sikorsky S-55, the largest available ship of its type up to now, has undergone a fiery baptism and proven itself many times over. But the mushrooming popularity of the industry's services, bringing about a geometric increase of passenger and cargo traffic, created a strong demand for greater capacity and greater speed. The S-58 is the answer to that demand.

The advantages of the S-58, powered by the Wright R-1820 1525 hp engine, over the S-55, powered by the P&W R-1340 600 hp engine, are several and salient. Among the chief gains are: 1) it will increase lifting ability from 1,200 pounds to 4,000 pounds; 2) it will increase passenger capacity from five to 12; 3) it will increase cruising speed from 85 miles per hour to 105 miles per hour. These time saving benefits will be passed on to passengers in speedier service, greater capacity, and even more convenient schedules than presently prevail. The total effect of the S-58 will be not only to more than double passenger and cargo capacity, but also to shave hourly schedules to half-hourly operations.

While the new fleet will sport a decidedly new look regarding capacity and speed, there is one item that will remain basically the same—the safety factor. Since the time of its inception, New York Airways has not had a single passenger injury. This record is due in large respect to Superintendent of Maintenance Ray de Haan, Chief Pilot Howard Higgins and a crack crew of seasoned airmen, dispatchers and qualified mechanics. Application requirements for pilots are high. In order to qualify, a pilot must have at least 2500 hours of total flight time. A minimum of 250 hours of this time must be in helicopters. The overall specifications are a commercial pilot certificate with single and multi-engine, helicopter, and instrument ratings, and a completed written A.T.R.

Once a pilot has met all the qualifications and been accepted to fly for New York Airways, an additional 50 hours of flight time are required before he can take over a scheduled passenger flight. Of this, 25 hours must be in an S-55 and 25 hours on the route. The latter provision is to thoroughly acquaint the pilot with appropriate emergency procedures and maneuvers. It might be added that the routes themselves have been gone over very carefully by Capt. Higgins and his staff and have been so selected that there is always a precautionary landing area under a ship in flight. Up to the present there has been very little occasion to make use of these spots, but there is decided comfort in knowing they are there should the need arise.

One of the few incidents in New York Airways' history occurred a short time ago when a ship carrying passengers to Newark Airport developed engine trouble over New York City. In a matter of seconds the pilot brought the ship gently to rest in Central Park. The only "casualty" was a tag for "illegal parking" served by one of New York's Finest. It was duly rescinded when the nature of the landing had been confirmed.

As of the first of December 1955, New York Airways has flown in excess of 1,099,577 scheduled miles; has flown 19,233 revenue hours; hauled approximately 7,371,611 pounds of mail; 924,713 pounds of air freight; about 1,694,753 pounds of air

(*Continued on page* 40)

by Jean H. DuBuque

Executive Director, NBAA

Business Planes Save Time and Money

"Business air transportation is simply the job of getting company officials to and from their necessary field contacts in time intervals it would otherwise be impossible to achieve." So said Owen Mayfield, chief pilot for Hercules Powder Company's two DC-3's. The company is now in its eleventh year of business aircraft operations.

Mayfield further pointed out that the primary use of their company planes is to provide transportation for key personnel to plants in various sections of the country. All schedules are arranged to fit the convenience of Hercules personnel, giving them more time at the plants and at home than would be possible in commercial air travel or by any other means.

"Our planes can operate off the beaten track, and bridge places on the map that would be difficult if not impossible to achieve by the commercial airlines," one company official said.

The two planes also fill a major role in sales and service activities of the company. Customers can visit Hercules main plants and the central research laboratory in Wilmington, Delaware, without inconvenience or delay; Hercules technicians and experts can respond quickly to a customer's request for assistance in handling a company product, or in running down a complaint.

To demonstrate the time saving effect of owning and operating company planes, Hercules executives from the Wilmington office can leave their homes in the morning, fly to St. Louis or Chicago, have three hours working time there, return to Wilmington for dinner that night, and be back at their desks the next morning. The four-hour flight to Brunswick, Georgia, makes the same work schedule possible. Trips to the Hopewell, Virginia, plant, requiring about one hour and fifteen minutes, mean only one day away from the office. By contrast, the same trip by train requires an absence of two nights and one day.

Although flights in the eastern and mid-western sections of the country predominate on the Traffic Department's air schedule, Hercules' planes —when required—travel to all parts of the United States and southern Canada.

Mayfield was the first pilot employed by Hercules, coming on the scene in October of 1944, a little more than a month before the company acquired its first plane, a C-45 twin-engine Beechcraft.

The acquisition of this first airplane by Hercules was directly allied with the company's defense commitments. The year 1944 was the year of the big production push, and the armed forces were in a hurry to get vitally needed war material. Hercules' Explosives Department, charged with the operation of five government ordnance plants widely scattered across the nation, fought the battle of airline priorities, erratic flight schedules, and the problem of linking major airports to isolated off-airway plant locations.

The U. S. War Department suggested that the company might do better with its travel schedules if it owned a plane, which, considering the unavailability of civilian aircraft in those days, was virtually top-priority clearance for the purchase of that first twin Beechcraft. It was flown out of the factory in December of 1944 and back to Wilmington by Mayfield, carrying as its first passengers a number of Hercules men who still recall the freezing cold of the C-45 stripped for military use and Spartan hardihood.

A few months proved conclusively to Hercules the value of the airplane, and late in 1945 the Beechcraft was sold and a larger Lockheed *Lodestar* was purchased. William P. Hobson had joined Owen Mayfield as co-pilot at the time the first C-45 was bought to enable the plane to carry out tough flying schedules. In those days some Herculites almost lived in the plane, crisscrossing the country to oversee the urgent work at ordnance plants. Bill Hunt, and H. V. Chase, both now retired, Henry N. Marsh, and the late W. R. Ellis were the shock troops of this operation, working around the clock and seven days a week.

Late in 1946, the second *Lodestar* was put into operation, after the company took a long and hard look at the time saved in moving key men to and from production trouble spots. In 1950, bowing to the need for greater passenger capacity, one *Lodestar* was sold and the first DC-3 put into service. Another of these larger aircraft replaced the second *Lodestar* a year later.

Born of a need brought about by hectic wartime production schedules, the airplane also has proved its utility and value to the peacetime operations of the company. Hercules was no pace-setter in the growing trend toward company-owned planes; other companies with plants located around the nation were earlier converts and some operate many more planes. Today, even the corporation executive who flies his own plane for business purposes is no longer unique.

The Hercules air operations, which consisted of one comparatively small plane and two pilots in 1944, has grown in ten years to two planes and five pilots.

Each pilot has the background and training equal to that required of pilots on the commercial airlines. And just like the airline pilots, Hercules pilots must return to school once each six months for a refresher course, be upgraded in the use of new equipment and techniques, and take an examination to check individual pilot proficiency.

Both of the DC-3's, equipped with oversized engines for reliability and increased cruising speed, have had installed in them the most modern navigational aids, communications equipment and electronic devices. Attesting to all of this—the insistence upon the best in pilots and equipment —was the National Business Aircraft Association Annual Meritorious Safety Award recently presented to Hercules upon the completion of approximately 2,104,035 plane miles of accident-free operation.

Jack Schaum, chief of maintenance for the past five years, deserves the lion's share of the credit for this outstanding flight record, according to

(*Continued on page* 38)

Trends in the Common System for the Next Three

SKYWAYS FLIGHT OPERATIONS ROUND TABLE

APRIL 1956

Aviation Club
Washington, D.C.

New Gear and New Frequencies To Ease Communication Are Problems Panelists Find; Need Is Seen For:

- Reduction in VHF Interference
- Fifty KC Spaced Channels
- Direct Center Controller-Pilot Contact
- No Increase in Need To Shift Frequencies
- Non-Safety, Public Service Channel
- Lightweight, Multi-Channel Equipment

Moderator Frank C. White (*Air Transport Association*): "Our subject today concerns the 'Trends in the Common System for Aeronautical Communications in the Next Three to Five Years.' We plan to discuss both the operational trends as expressed by CAA, the airlines, NBAA, AOPA and others, as well as the trends in airborne equipment.

"Assembled here is a group of individuals each of whom is well qualified in the field we will consider. I would like to ask Mr. Manhardt to tell us of CAA's plans with regard to aeronautical communications which might require additional communication equipment in the airplane."

R. T. Manhardt (*Civil Aeronautics Administration*): "I'm sure we all realize that the direct controller-pilot radio communication service, first used by airport traffic controllers and subsequently by the controllers at air route traffic control centers, is necessary for the safe and

ATTENDING *discussion on aeronautical communications are (L to R, seated) R. B. Nelson, Technical Enterprises Ltd.; R. T. Manhardt, CAA; W. A. Jensen, American Airlines; C. A. "Cap" Petry, Aeronautical Radio, Inc.; F. C. White, ATA; Jean DuBuque, NBAA; C. I. Rice, Bendix Corp. Radio Division; J. V. Wilcox and R. W. Lee, Wilcox Electric Co., and (L to R, standing) G. F. Quimby, National Aeronautical Corp.; Max Karant, AOPA; W. B. Hawthorne, FCC; R. P. Dutton, Collins Radio Co., and H. F. Tanke, RTCA.*

Aeronautical Communications to Five Years

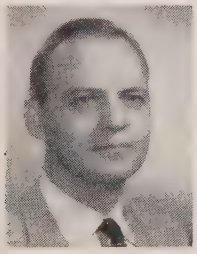
orderly movement of aircraft along the airways. When surveillance radar is used, this permits more efficient use of the airspace by reducing the separation between aircraft, it is mandatory that there be a direct radio communication link between the controller and pilot. Increased emphasis is now being placed on the need for all center controllers to be able to talk directly with the pilots. CAA's plans for the future are aimed in that direction.

"I suppose you remember how the center direct communication service started, during 1951, in an effort to speed up the arrival of aircraft at airports in the vicinity of the center. The program called for a single VHF channel at each air route traffic control center location. This was a low cost improvement which paid off many times over in reducing delays and eliminating some of the frustration of the controller who could not talk to the pilot when it was most important to do so. The success of this initial effort resulted in the use of additional channels in order to speed up departures as well as further shorten the arrival intervals.

"The following year a problem of the San Antonio Center, encountered in feeding traffic into the Houston approach control area, was removed by use of VHF channels installed at Houston and operated via landlines from San Antonio. We tagged this as a 'peripheral' facility and you may have heard of similar installations since then in other areas such as Buffalo for the Cleveland Center and Barnegat, Scranton, Westchester and Philipsburg for the New York Center. Wherever practical to do so the center communication equipment is installed on nearby high terrain sites to get the necessary additional coverage and minimize the control circuit recurring cost.

"But let's get back to your question, Frank, that of CAA plans. Of course I can be specific only as regards the schedule through the current fiscal year since fiscal year 1957 and beyond will depend upon what money the Congress makes available for that purpose. Before coming over here this afternoon I took a quick reading on the number of present installations and found totals of 54 channels at the center locations, three on high sites and 12 at peripheral sites. These will be increased to 98, 25 and 32 respectively and all should be available for use before next winter sets in. I hope we can be well along with the use of 100 kc channel spacing by then because otherwise some of the additions just can't be placed in operation.

"So much for the centers. No conspicuous change is expected to occur in the airport traffic control tower picture. At many locations, however, I imagine the controllers would be given a big lift by a reduction in their guard of the present wide variety of frequencies. The same holds for the airway communications stations, although a lesser problem there. Speaking of the INSACS, it looks as though some change may be brought about as a result of the direct center-pilot communication service



ROUND TABLE PARTICIPANTS

FRANK C. WHITE, moderator, with ANTC Division of ATA for past five years, he has been in airlines communication, navigation, and traffic control for 17 years.

WILLIAM B. HAWTHORNE joined FCC in '46 after serving in CAA's radio development div. from '41. He is chief, systems and frequency planning of FCC's aviation div.

R. P. DUTTON is manager Collins Radio Co.'s Washington, D. C., office; joined Collins in '50. With Pan Am. 15 years, last position communication supt. Atlantic Div.

JEAN H. DUBUQUE, executive director of the National Business Aircraft Association, has been active in aviation for more than 20 years. He is a member of IAS and QB's.

RICHARD B. NELSON, vice president, Technical Enterprises Ltd., was eight years in de Havilland Aircraft of Canada's engineering department before joining TEL.

C. A. "CAP" PETRY is director of technical services for Aeronautical Radio, Inc. For 17 of his 24 years in aviation communications he served with United Air Lines.

G. F. QUIMBY, sales manager for National Aeronautical Corp. since 1951, was with RCA and Naval Research Laboratory. He received his EE degree from Oregon State.

HAROLD F. TANKE, American Airlines radio engineer 1935-39; CAA airline inspector 1940-49; is technical staff officer Radio Technical Commission for Aeronautics.

MAX KARANT, recently named vice president of Aircraft Owners and Pilots Assn. has been a leading spokesman for private flying for years. He is a licensed pilot.

CLARENCE I. RICE, manager of aviation, Bendix Corp.'s Radio Division since '53, was with ARINC and Northwest Airlines after serving as naval radar officer '43 to '46.

ROBERT W. LEE, manager airborne equipment sales, Wilcox Electric Co.; was with ARINC and TWA after WW II. He worked for Douglas and Solar Aircraft before war.

JAY V. WILCOX formed Wilcox Electric Co., Inc., in 1951 and serves the firm as president. Since 1938 his entire effort has been devoted to aviation communications.

R. T. MANHARDT served with the U. S. Navy in the communications field before joining CAA's predecessor organization in 1928. He now is a CAA planning officer.

WALTER A. JENSEN, a pilot with American Airlines since 1940, is on special assignment to the Air Transport Association. He is a member of RTCA's SC-56.

but this should be considered merely as a reduction in workload and not one of need. As you know, the average INSACS performs a variety of important jobs—the relay of control and related information between the centers and aircraft being just one of them."

Frank C. White: *"We see your program then as one that is expanding the opportunity for direct communication between the CAA controller and the pilot. The man needing the service is provided direct communication with the agency responsible for providing the service.*

"Perhaps we should ask some of the users of the airspace to comment on their needs for this three to five year period we are considering. I wonder, Captain Jensen, if you would comment on what the effect will be of the airlines' trend toward jet airplanes on the aeronautical communications problem."

Capt. Walter A. Jensen (*American Airlines*): "Before talking about the jet, I think we should look at our communication requirements. Very briefly they could be summed up as the need for reliable and rapid transmission of information. We should have good intelligibility with freedom from interference. Communications reliability in terms of jet aircraft must take into consideration the fact that we'll be flying at high altitudes which will increase the problem of interference. Considering the line of sight characteristic of communications in the VHF band, we are going to have to be very careful that transmitting stations are so located that we don't have interference from an overlap in areas of coverage.

"I would like to mention here that there may be some difference between the communicator's and the pilot's definition of interference. The communicator, I believe, tends to limit his definition of interference to those cases where the received signal is unintelligible. Pilots tend to a broader definition which includes as interference anything which tends to make the reception of the desired signal more difficult. For example, the pilot objects to the interference when he has to mentally filter out the transmissions from stations with which he has no need to communicate from the transmissions of the station with which he is communicating. This is especially true when both signals are of almost equal intensity. We will have to watch this overall problem as we move upstairs with jet aircraft. Of course, with jet aircraft we are going to be moving so fast that the whole communications system —air-ground-air and point-to-point—will have to be geared to cope with that speed."

Frank C. White: *"How do we stand on the air-to-air interference problem today?"*

Capt. Walter A. Jensen: "We continually get reports of interference from pilots who are in the so-called high density areas where a great deal of voice communication takes place."

Frank C. White: *"Dick, do you have a comment on this point?"*

R. T. Manhardt: "I don't know how many realize that the interference problem which Walt described is a direct result of airborne limitations. Specifically, there is a deficiency in the number of channels which can be used by the pilot for communicating with air traffic control facilities. Of course there are limitations at the ground facility, but I believe that a fair assessment of the present situation would disclose the aircraft communication equipment as being the big reason for most of our communication problems, including interference, and I'm not excepting military aircraft in this situation.

"Let me give you a couple of 'for instances.' In the Chicago-Boston-Norfolk triangle, insufficient geographical spacing exists in most cases between ground facilities using the same VHF channel. This is producing serious air-to-air interference. Additionally, controllers must frequently repeat their messages, and in some instances pilots have received and acted upon, fortunately without serious consequences, control instructions that were received from an interfering control facility."

Frank C. White: *"I think that is a good point, Dick. It is quite easy for the CAA to implement a new frequency on the ground. A transmitter that is interfering with some communications function is simply moved to a new channel. What Dick is implying is that the problem isn't on the ground, it is in the air. Perhaps we should take a look at this from the standpoint of planning. Would Mr. Tanke of RTCA brief us on the work of the people who have been responsible for planning aeronautical communication through RTCA? What have they predicted in this regard? Were our present problems completely unpredicted or were they anticipated?"*

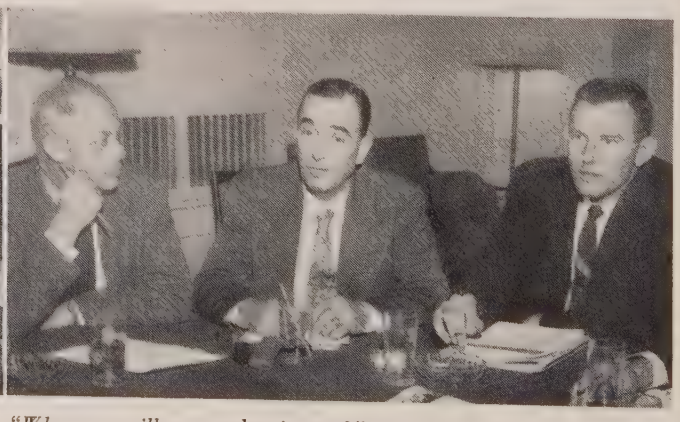
Harold Tanke (*Radio Technical Commission for Aeronautics*): "I doubt, Frank, if we could use the term 'predicted.' However, with the continual growth of aviation, an increase in the communication needs was anticipated. Some of the initial VHF communication planning by RTCA was that of SC-1 in 1946. SC-1 recommended multi-channel VHF airborne equipment for all aircraft operating IFR. Private aircraft operating VHF were to have a minimum of five transmitting frequencies. Later that same year, Special Committee-4 developed a plan for the utilization of the frequencies in the 108 to 132 megacycle band."

Frank C. White: *"What do the most recent studies of RTCA show on this, Harold?"*

Harold Tanke: "The most recent study is that of SC-56 beginning in 1950. A problem of providing additional channels in the aircraft had developed and RTCA was asked to solve it. The communications equipment in most

(*Continued on page 32*)

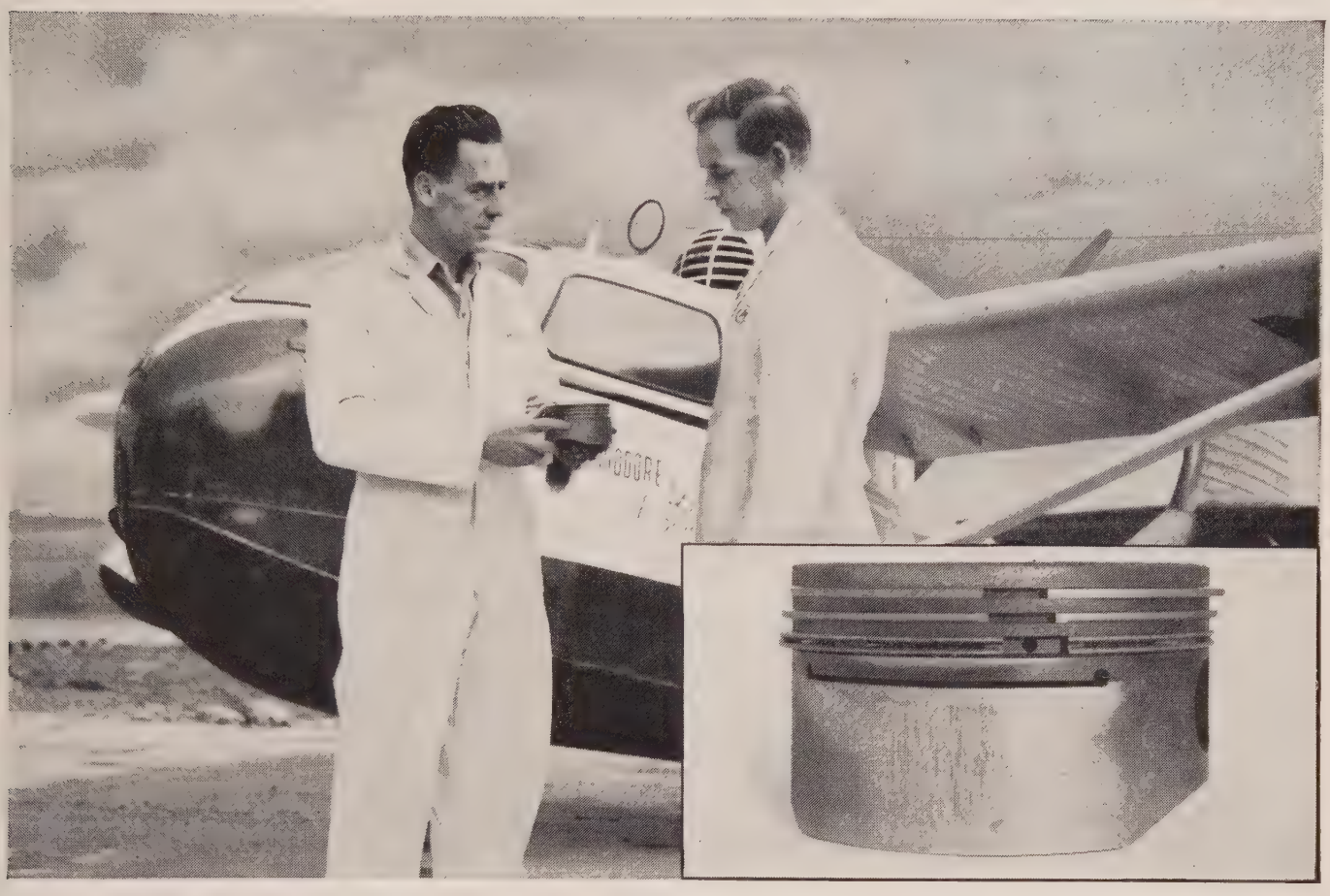
"Our new, light VHF 360-channel transmitter and 560-channel receiver uses crystal saver circuits," explains J. V. Wilcox, right.



"When surveillance radar is used," says R. T. Manhardt, center, "a direct radio link between controller and pilot is mandatory."

PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA



"Here's how we get 1000 safe hours between majors"

In spite of flying under much tougher conditions than most light planes ever meet, the amphibians and float planes of Commodore Air Service, Sausalito, California, consistently get 1000 hours between overhauls. Owner Bob Law explains:

"Our engines stay in top condition right up to overhaul time because we keep them perfectly tuned and use only RPM Aviation Oil, Compounded. The photo shows how clean 'RPM' keeps pistons and rings — oil drain holes stay completely clear. It holds down oil consumption, too. We don't add oil all day, even making as many as 50 full-power take-offs from water in 12 hours of sightseeing flights. And bearings stay in top shape, good enough to put back in place if we wanted to. 'RPM' really does a job for us. We wouldn't use anything else."

Both "RPM" Compounded and "RPM" *Uncompounded* are available from your Standard Airport Dealer. "RPM" Uncompounded is made from the same selected oil stocks, is extremely stable, holds wear to very low levels. For pilots who demand uncompounded oil of unexcelled quality.

TIP OF THE MONTH

It's wise to telephone or deliver your flight plans, rather than radio them in. Keep the air-to-ground channels clear for emergencies — the emergency may be yours.

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

We take better care of your plane

SKYWAYS FOR BUSINESS

News Notes for Pilots, Plane Owners Operating Aircraft in the Interest of Business

NEW CESSNA *tri-gear conversion gives improved visibility during run-up, take-off.*

Tricycle Conversion Kit Developed for Cessna 180

Fullerton, Calif. A conversion kit for tricycle gear on the Cessna 180 has been announced by Met-Co-Aire, Fullerton, Calif. It is similar to the 170 conversion.

The regular spring leaf gear is utilized by moving it back 30 inches and installing it into an entirely new box section. The nose wheel gear, which carries a 500 by 5 tire, attaches to the lower motor mounts forward and at the junction of the firewall aft. It is steerable through a wide range by the rudder pedals. Total weight addition is 34 lbs. Speed at sea level has been reduced one to two mph.

The conversion for either the 170 or 180 is shipped with complete instructions for installing. Present retail installed price is $950 for the 170 and $1,045 for the 180 at local dealers. The installation, which has been put through drop, flight, and static load tests, has received CAA approval.

Beechcraft to Hold Nationwide Safety Clinic

Wichita, Kan. Beechcraft's eighth annual "Safety and Efficiency Clinic" program for owners of Beechcraft planes will be conducted this spring and summer at more than 30 different points throughout the country.

The clinic, sponsored jointly by Beech Aircraft Corp. and its distributor organizations, will be open to owners of Beechcraft Bonanzas, Twin-Bonanzas, Model D18s and Super 18s. Until last year, the inspection program, carried out by teams of factory representatives, was conducted exclusively for the single-engine, four-place Bonanzas.

More than 100 major items will be checked on each plane. Since the start of the clinic in 1949, more than 6,000 Beechcraft planes have received free inspection service. Last year a record 1,368 planes were inspected. The number is expected to climb even higher this year.

Increase in Orders Delays DME Deliveries

Ambler, Pa. An upsurge in orders for Distance Measuring Equipment has created a 60-day delivery backlog in Narco DME deliveries. Narco, which has delivered more than 230 DME units, recently began a six-day-a-week production schedule in order to meet the growing demand.

Increased installations by executive aircraft users and major airlines stem from clarification of the air navigation picture, principally the realization that any other system could not go into full airway use in much less than a decade.

Narco presently is pushing construction of a new plant, plans for which were announced several months ago.

Bonanza Instrument Cluster Designed by AC Spark Plug

Flint, Mich. A new aircraft instrument cluster design, developed by AC Spark Plug Division of General Motors in cooperation with Beech Aircraft Corp., will appear as standard equipment on the 1956 Beechcraft Bonanza.

Designed on the theory that buyers of executive-type aircraft prefer modern design in aircraft instruments just as they do in automotive instruments, the new instrument cluster is decorative, easy to install and service. It consists of only two main parts—instrument case assembly and decorative face.

The cluster is mounted on the front of the plane's dash panel. Two screws hold it firmly in position on the dash board panel.

Housed in the cluster are an ammeter, fuel cylinder-head temperature, oil pressure, oil temperature and fuel pressure gage. It is covered with a vacuum-metallized plastic face and fits into a dash opening approximately six by seven and one half inches.

Twin-Engine Emergencies Discussed in CAA Bulletin

Washington, D.C. The increased use of twin-engine aircraft for business and general flying has prompted the CAA to issue a bulletin on how to handle such aircraft under emergency conditions in flight. Aviation Safety Release No. 400, available without charge from the Office of Aviation Information, CAA, Washington 25, D.C., points out that many pilots, with no formal transition training from single-engine aircraft, are piloting twins. The release notes features of the flight characteristics of twins which require pilot techniques beyond those required for single-engine aircraft.

Fifth Cessna Model Added to 1956 Line

Wichita, Kan. The Cessna Model 182 became the fifth addition to the company's 1956 line of business aircraft when it was introduced recently by Cessna dealers throughout the nation. The 182 features Cessna's "Land-O-Matic" gear, as does the Model 172 introduced last November.

Powered by a 230 hp Continental 0-470-L engine, the cruising speed of the 182 at 70 per cent power and 7,500 feet is in excess of 150 mph. Top speed is more than 160 mph while sea level rate of climb is listed at 1,100 feet per minute.

(*Continued on page* 52)

UPRESSIT *Products Corp.'s president J. B. Taylor III, flies the company's Ryan* Navion *from Conn. to Texas to introduce a new product to the petroleum industry. "The company plane is bringing back the personal touch in business," states Taylor, shown at the Jefferson County Airport, Port Arthur, with Clayton M. Lee, left, Upressit Corp.'s sales agent for Texas.*

Latest IFR Departure Procedures for Burbank

Because of the large number of business and professional pilots using Burbank-Lockheed Air Terminal to avoid delays at Los Angeles International, NAVICOM presents the following information for pre-flight planning.

Burbank–Camarillo (BUR–CAV)

Via the west course BUR ILS. Cross BUR LOM (min 4000 ft asl) direct to CAV. Cross CAV (min 5000 ft asl).

Burbank–Los Angeles (BUR–LAX)

Via the west course BUR ILS to 3000 ft asl, left turn, via Amber 1 to LAX. Cross LAX LFR at (min 4000 ft asl).

Burbank–Simi (BUR–SMI)

Via the west course BUR ILS. Cross BUR LOM (min 4000 ft asl). Via 270° magnetic track to intercept southwest course Newhall LFR. Cross Simi (min 6000 ft asl).

Burbank–Santa Barbara (BUR–SBA)

Via the west course BUR ILS. Cross BUR LOM (min 4000 ft asl). Via 91° radial of SBA VOR to SBA. Cross Santa Paula Intersection (min. 5000 ft asl). (Min 7000 ft asl Santa Paula Intersection to SBA.)

Burbank–Newhall (BUR–EHA)

Via the west course BUR ILS. Cross BUR LOM (min 4000 ft asl). Via direct Chatsworth, direct EHA. Cross CSW (min 5000 ft asl). Cross EHA (min 7000 ft asl).

Burbank–147° Fillmore (BUR–FIM)

Via the west course BUR ILS to intercept 147° radial of FIM VOR. Via the 147° radial. Cross FIM (min 6500 ft asl). Via Victor 12 (min 9000 ft asl), via Victor 209 or Victor 107.

Burbank–110° Fillmore (BUR–FIM)

Via the west course BUR ILS. Cross BUR LOM (min 4000 ft asl). Via the 110° radial FIM VOR. Cross FIM (min 6500 ft asl Victor 12; 9000 ft asl via Victor 209 or Victor 107).

Southeast Reversal

Via the southeast crs BUR LFR to 3000 ft asl within 15 miles Lockheed Air Terminal; 180° right turn homing on BUR. Cross BUR (min 5000 ft asl).

Southeast 240°

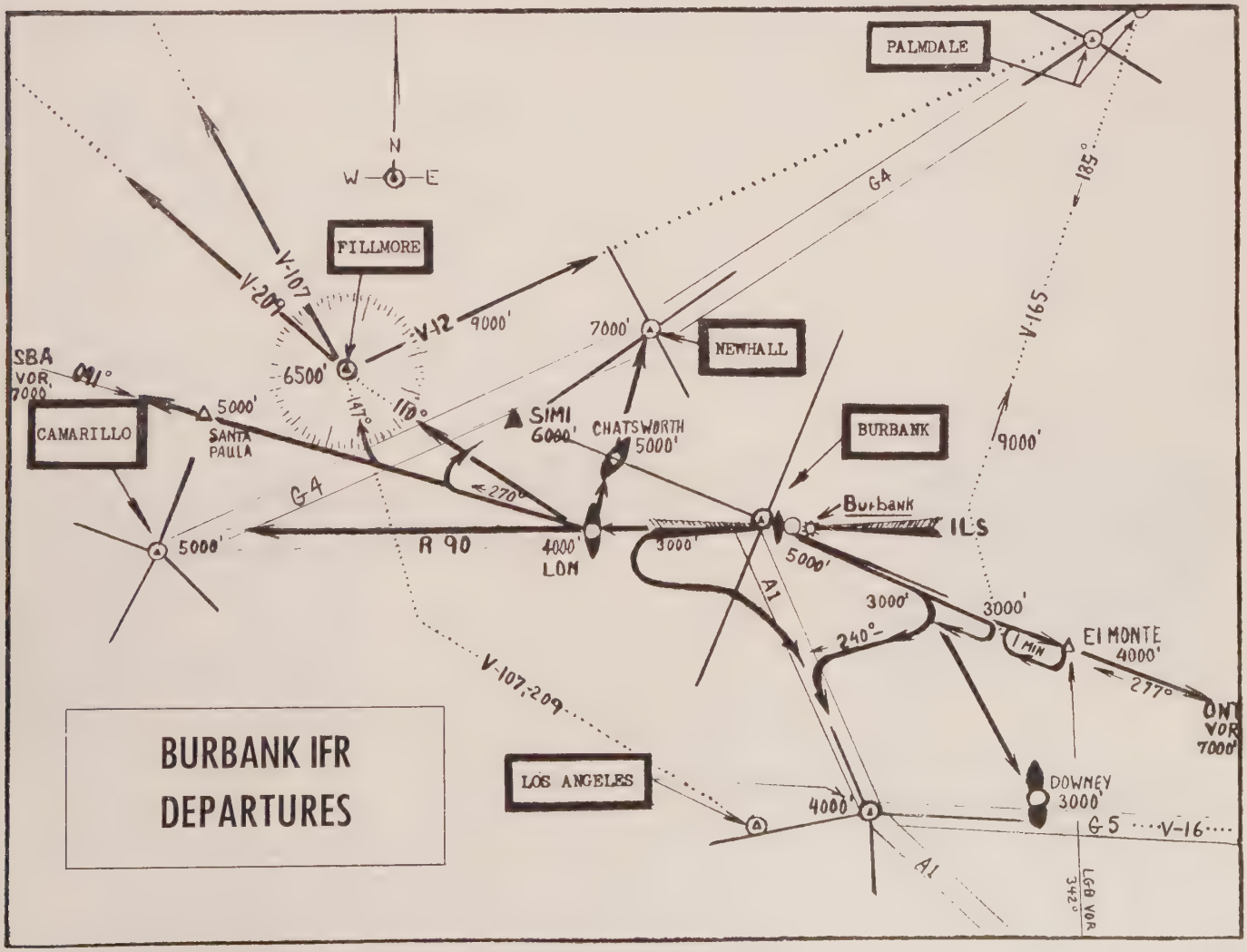
Via the southeast course of BUR LFR to 3000 ft asl within 15 miles Lockheed Air Terminal. Climbing right turn to 240° magnetic to intercept and proceed southbound on the north course LAX LFR.

Southeast Downey–(DOW)

Via the southeast crs BUR LFR to 3000 ft asl. Home on DOW. Cross DOW (min 3000 ft asl).

Southeast El Monte (ONTARIO–ONT)

(Dual VOR Required) Via the



southeast course BUR LFR to 3000 ft asl. Then via the 277° radial ONT VOR. Cross El Monte Intersection (min 4000 ft asl). Additional climbing or holding to be accomplished in a one minute right turn pattern northwest of El Monte. (Minimum crossing alt.—El Monte Victor 165 Palmdale 9000 ft asl; El Monte direct ONT 7000 ft asl.)

Stratus

The following additional departure procedures may be used with stratus conditions:

a. *260°*—Climb on heading of 260° magnetic to "at least 1000 ft on top." (Top limitation 5000 ft).

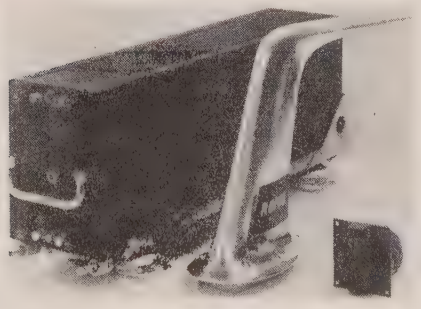
b. *Southeast*—Climb on southeast course BUR LFR to "at least 1000 ft on top" within 15 miles Lockheed Air Terminal. (May be used when top reported at DOW by LAX Tower is less than 3000 ft).

Narco Multi-Channel VHF Meets Latest TSO Specs

The Sapphire 1016, a VHF communications unit with 90 to 360 transmitter channel capacity and up to 560 channel receiver capacity, has been announced by National Aeronautical Corp., Ambler, Pa.

The new Sapphire 1016 is the *first* aircraft transmitter-receiver combination to be put on the market in compliance with the new, more stringent TSO requirements set up by CAA for airline-type equipment. These requirements call for standards of construction, performance, and operation under environmental conditions far more severe than previously required. The Narco 1016 complies with CAA TSO numbers C-37 and C-38.

Occupying a one-half ATR rack, the Sapphire 1016 weighs 24¾ lbs. Its compact size (approximately 50 per cent *smaller* than similar channel capacity equipment) is accomplished by ingenious crystal circuitry which permits crystal-controlled reception on 560 channels with only 48 crystals. Thirty-eight crystals are used for 360 channel transmitter capacity. Miniature crystals pioneered by Narco in its DME unit conserve weight and space.



A "basic" model Sapphire 1016 is

(*Continued on page* 28)

Air-Aids Spotlight

BALTIMORE, Md.—*BVOR due for modification shut-down middle of May.*

BOSTON, Mass. — *Procedure turn on ILS backcourse is on West side, 1500′ within 15 mi. of the LFRange.*

BUFFALO, N. Y.—*BVOR due for modification shut-down last half of month.*

CANADA — GREENWOOD, *Nova Scotia Radio Beacon now on 527 KC.*

—LONDON, Ont. *BVOR on 117.2 mc, ident. "XU" on airport.*

—MONTREAL, Que. *BVOR on 116.3 mc, ident. "UL" on airport.*

—OTTAWA, Ont. *BVOR on 115.3 mc, ident. "OW" on airport.*

—QUEBEC, Que. *LFRange North-South courses now 146°-326° resp.*

—STIRLING, Ont. *BVOR on 115.6 mc "QC"; 331° mag., 5½ mi. from LFR.*

—TORONTO, Ont. *BVOR on 116.2 mc "YZ" located on airport.*

—WINDSOR, Ont. *BVOR on 114.3 mc "QG" located on airport.*

CHICAGO, Ill. — *MIDWAY AIRPORT TVOR and ILS system changing identification to "MDW," LOM to be "MD," LMM to be "DW" about end of month.*

CHILDRESS, Tex.—*BVOR to resume operation on 117.6 mc.*

CLEVELAND, O.—*GCA transmissions no longer available on Low Frequency Range.*

DAYTONA BEACH, Fla.—*Due temporary BVOR shutdown, IFR altitudes on Victor 3 below 6500′ VERO BEACH—JACKSONVILLE not approved by ARTC.*

GORDONSVILLE, Va.—*BVOR due for modification shut-down end of month.*

GREENSBORO, N. C.—*ILS Straight-In minimums raised to 300-¾ (approach lights decommissioned).*

JUNCTION, Tex.—*BVOR to resume operation on 116.0 mc.*

KIOWA, Col.—*New VORW on 112.6 mc "IOC" 36 miles 128° from DENVER VOR.*

KNOXVILLE, Tenn. — *Airport Surveillance Radar commissioned.*

LAKE UTAH, Utah—*New VORW on 116.6 mc "UTL" located 39 mi. on South course SALT LAKE CITY LFRange at FAIRFIELD bend V-21.*

LONG BEACH, Cal.—*LFRange and ILS missed approach climb-out heading, after initial pull-up to 800′ changed to 200° to intersect South course LOS ANGELES LFR further south.*

MEXICO, D. F.—*Pachuca VOR, ident. "PCA," frequency 112.7 mc commissioned, 011°—33 miles from MEX LFR, on TAMPICO—MEXICO CITY direct route.*

MIAMI, Fla.—*Other Hi-Density Area authorities and operators watching results of experimental local regulation establishing* speed limit *of 180 knots within ten miles of airport at or below 3000′* at night! *[Ed.—Why not* at all times?*]*

MOLINE, Ill.—*Back course ILS approach approved, landing Runway 27.*

NEWPORT NEWS, Va.—*ILS missed approach pull-out changed to 300° to CHARLES CITY Intersection rather than YORKTOWN RBN.*

ONTARIO, Cal.—*BVOR due shut down in month of May.*

PUEBLO, Col.—*Due to erroneous VOR location on chart (facility shown about 1 mile south of actual location), pertinent approach bearings should read 077° outb'd 277° on final.*

SAN FRANCISCO, Cal.—*TVOR commissioned "SFO" 111.8 mc on airport (DME).*

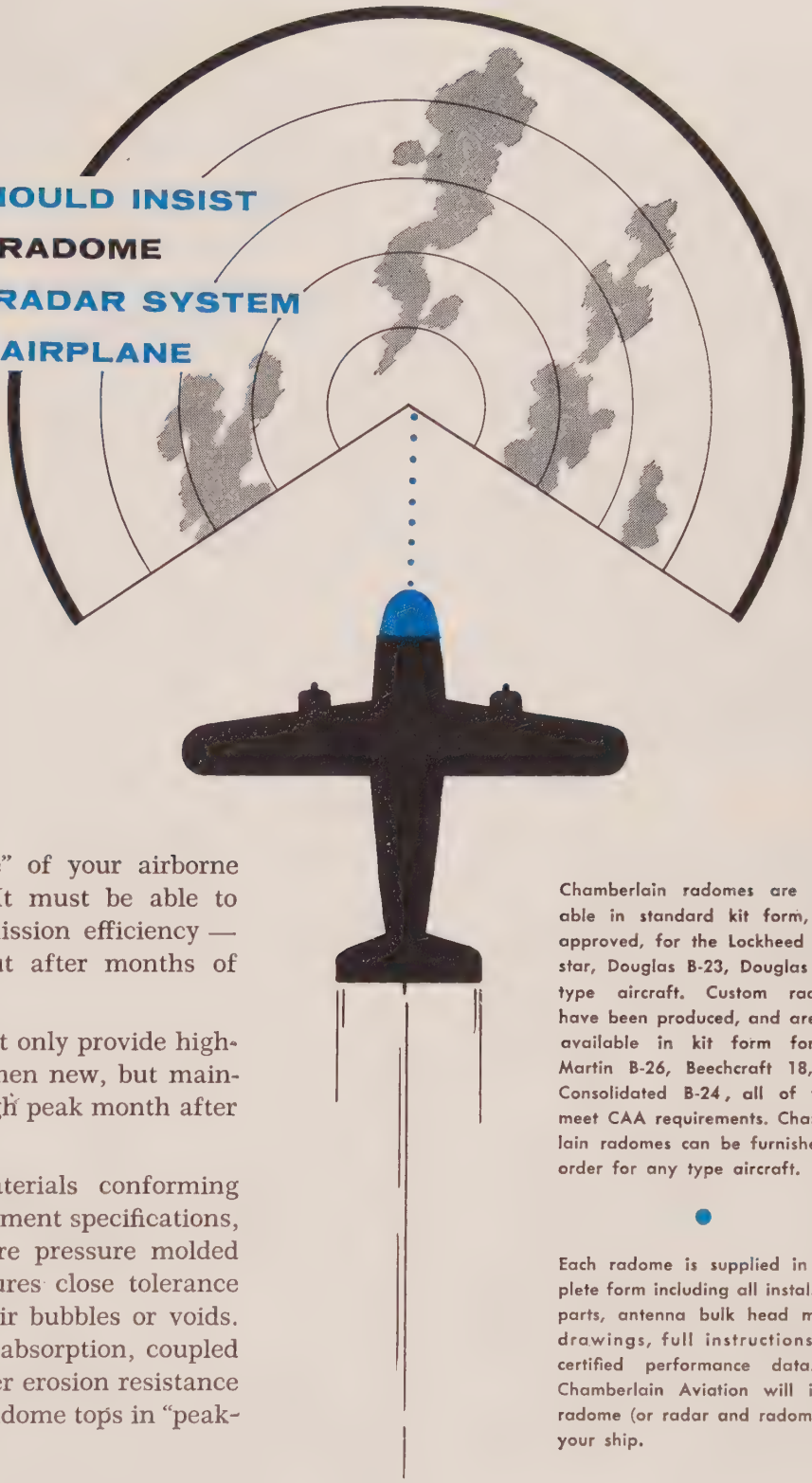
ST. PETERSBURG, Fla.—*Straight-In and Circling TVOR minimums now 400-1 at new location on field with addition of HARBOR FM (.5 mi. NW). Tower Primary VHF frequency now 122.7 mc.*

UTICA, N. Y.—*LFRange approach circling minimums now 400-1, 500-1.*

VERO BEACH, Fla.—*Low frequency radio beacon and approach discontinued.*

SPECIAL NOTICE—*All Outer Compass Locator (ILS)* voice *idents. being discontinued.*

HERE'S WHY YOU SHOULD INSIST ON A CHAMBERLAIN RADOME FOR THE AIRBORNE RADAR SYSTEM ON YOUR BUSINESS AIRPLANE



The radome is the "eye" of your airborne radar weather system. It must be able to provide adequate transmission efficiency — not only when new, but after months of service.

Chamberlain radomes not only provide highest possible efficiency when new, but maintain that efficiency at high peak month after month.

Manufactured from materials conforming fully to applicable government specifications, Chamberlain radomes are pressure molded by a process which assures close tolerance cross sections, without air bubbles or voids. Exceptionally low water absorption, coupled with unusually high water erosion resistance make the Chamberlain radome tops in "peak-continuing" efficiency.

Write today for full data on the Chamberlain radome.

Chamberlain radomes are available in standard kit form, CAA approved, for the Lockheed Lodestar, Douglas B-23, Douglas DC-3 type aircraft. Custom radomes have been produced, and are also available in kit form for the Martin B-26, Beechcraft 18, and Consolidated B-24, all of which meet CAA requirements. Chamberlain radomes can be furnished on order for any type aircraft.

Each radome is supplied in complete form including all installation parts, antenna bulk head mount, drawings, full instructions and certified performance data. Or Chamberlain Aviation will install radome (or radar and radome) on your ship.

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CHAMBERLAIN AVIATION, INC.

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Largest Supplier of Radomes for Executive Aircraft

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MODIFICATION WORK • SYSTEMS ENGINEERING AND INSTALLATION • DESIGN • RESEARCH • CUSTOM INTERIORS

Official NBAA Report

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

(formerly Corporation Aircraft Owners Association)

National Business Aircraft Association, Inc. is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable business aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. NBAA National Headquarters are located at Pennsylvania Building, Suite 344, 13th & Pennsylvania Avenue, N.W., Washington 4, D.C. Phone: National 8-0804.

CAA Questions NBAA On Radio Equipment Plans

NBAA has been requested by the CAA to canvass business aircraft operators to determine their airborne communications equipment status and plans.

Air traffic control communications requirements in the Chicago-Norfolk-Boston triangle are now exceeding the available number of usable 200 kc separated channels. Additional channels readily can be obtained only by placing in use more frequencies within the 118-127 mc band. It is therefore imperative, in the interest of safety and rapid communications, that even-tenth-decimal frequencies in the 118.1/121.3 and 123.6/126.7 mc portions of the 118-127 mc band be activated as soon as possible in the congested northeast United States.

The implementation of 100 kc channeling is considered to be the first step toward the eventual use of 50 kc channel operation in the 118-127 mc band (RTCA SC-56). Airborne equipment capable of 50 kc channel separation is now available on an "across-the-counter" basis; this equipment will, of course, operate on 100 kc channeling.

NBAA understands that a substantial number of the scheduled air carrier aircraft now have the 100/50 kc channel equipment installed. It may be possible to obtain some relief of the present congestion by replacing some of the present frequencies having less than adequate co-channels spacing with even-tenth-decimal frequencies. For example, at Washington, 125.1 mc might be changed to 125.0 mc. However, airline aircraft contribute only a portion of the communications load. Some operational and technical problems in CAA's facilities may arise until such time as all aircraft normally expected to engage in IFR flights are equipped for at least 100 kc channel operation.

Some aircraft operators are procuring "cast-off" VHF equipment. The thought occurs that these operators may feel that this obsolete equipment will fill their needs. This equipment will not accommodate 100 kc channel operation without further extensive modification. Operators in some areas have not yet provided equipment capable of using all the present 200 kc separated channels. It cannot be emphasized too strongly that the present and future high speed aircraft are vitally dependent upon rapid clear-channel communications for safe and efficient control of air traffic. The CAA urges business aircraft operators whose activities involve IFR operations to provide radio navigation and communications capable of 100/50 kc channel operation. Aside from the immediate need for 100 kc channeling in the northeast United States, the expansion of tower, RAPCON, center peripheral and high-site requirements will necessitate activating several additional frequencies throughout the United States. To satisfy these requirements, it may be necessary to employ even-tenth-decimal channels in other areas such as St. Louis-Kansas City & Los Angeles-San Francisco.

The need for 100 kc channeling in the 118-127 mc band has long been apparent.

Anticipation of this need resulted in its presentation and adoption in the ICAO and it now appears in Annex 10. Equipment now installed in centers and towers is capable of operating with 100 kc channeling with reasonable geographical spacing between ground and airborne transmitting facilities.

The CAA would appreciate your comments as soon as possible, in order that the earliest possible target date can be established for activating even-tenth-decimal frequencies. Write to: Civil Aeronautics Administration, Airways Operation Division, T-4 Building (W-381), Washington 25, D.C.

Insurance Available To NBAA Member Pilots

NBAA's board of directors recently approved a very comprehensive group policy covering "Pilots Loss of Certificate Disability Insurance."

Only NBAA member pilots and copilots are eligible for this exclusive insurance coverage which became available on April 1, 1956. Full details concerning the policy are available in a special brochure.

During the past year, NBAA's board of directors, as well as a special insurance committee, has spent considerable time and effort in studying all aspects of this insurance program, and are convinced that the coverage being offered is the best obtainable, extremely liberal, and has a very low premium. It also has the added advantage of being *underwritten* by a highly reliable *American* insurance company.

Upon termination of employment of the insured person with an NBAA member company, the policy becomes immediately void. A provision of the policy, however, permits the insured person, no longer employed by an NBAA member, to convert to an individual policy at higher premium rates than in current use for the group policy.

Great interest has been expressed throughout the NBAA membership on part of the pilots in this outstanding insurance coverage. The Association sincerely believes that the end results more than justify the time and effort spent in thoroughly canvassing the field for the best possible coverage.

Curtis to Aid President As Aviation Facilities Planner

NBAA is especially pleased that Edward P. Curtis, vice president of NBAA member, Eastman Kodak Co., Rochester, N. Y., has assumed his most important duties as Special Assistant for Aviation Facilities Planning to President Eisenhower. This post was recommended by the Harding Aviation Facilities Study Group in its report to the Budget Bureau (see March Report).

The President's appointment of Curtis represented full endorsement and direct implementation of the Harding group's recommendations.

Curtis has been delegated the responsibility for (a) Direction and coordination of a long-range study of the nation's requirements for aviation facilities, (b) Development of a comprehensive plan for meeting in the most effective and economical manner the needs disclosed by the study, and (c) Formulation of legislative, organizational, administrative and budgetary recommendations to implement the plan.

When Curtis was appointed, the President stressed that the "revolutionary possibilities and the all-embracing character of aviation development require an independent, over-all study of this national problem." He indicated his concern over the growing civil and military traffic and attendant problems in a letter to Curtis.

"I am taking this action," he said, "because the rapid technical advances in aviation and the remarkable growth in the use of air transportation have confronted the nation with serious aviation facilities problems.

"Modern aircraft can be operated in the numbers required by the national defense and the civilian economy only if airports, navigation aids, air traffic control devices and communications systems are suitable for their needs.

"Moreover, anticipated further increases

in air traffic, the introduction of jet propulsion for civil as well as military aircraft, the advances being made in vertical flight, and the greater use of higher altitudes, all presage much heavier future demands upon our facilities for navigation and traffic control," the President stated.

A comprehensive aviation facilities plan, looking ahead for some twenty years, should provide the basis for the following accomplishments: (a) Timely installation of technically adequate aids, (b) Optimum coordination of efforts of the civil and military agencies, (c) Avoidance of costly duplications of systems and equipment, (d) Effective participation by state and local authorities and aircraft operators in meeting facilities requirements.

"To delay the formulation of the plan is to invite further congestion of the airspace, needless hazard, economic loss, inconvenience to users and possible impairment of the national security," President Eisenhower said at the time of Curtis' appointment.

Curtis was assured by the President that he would have the full cooperation of both the Department of Commerce and Department of Defense—both concerned with air transportation. These two and all other agencies interested in aviation will be Curtis' principal sources of assistance in carrying out his assignments.

Curtis is authorized to call upon any official of the Executive Branch for aid. Furthermore, President Eisenhower told him, "I shall expect that from time to time you will give me reports of your progress and that you will promptly advise me of anything that I might do to expedite your work."

Curtis served as a major general and chief of staff of the Strategic Air Forces in Europe during World War II under the command of Gen. Carl "Tooey" Spaatz. He holds a private pilot certificate and was a combat pilot in the first World War. Still active in the Air Force Reserve, Curtis is a director of the Air Force Association.

NBAA extends its best wishes to our member official in his vital and far-reaching study of the nation's aviation needs in the complex fields of air navigation, communication, airports, and air traffic control.

State Aviation Bodies Provide Special Services

In addition to the every day services performed by state aeronautics bodies, many additional services are offered, free of charge, to all segments of aviation such as advisory service on airport management, airport site selection, airport planning and construction and other technical subjects. Preventative maintenance advice usually is available to those airports having paved runways. Further, many state aviation bodies participate in air search and rescue activities. Surveys are periodically made to determine various aeronautical needs and meetings in the interest of flying are sponsored and encouraged.

Equally as important as the services offered are the materials available, such as film libraries, aeronautical chart and airport listings. But did you know that such other items as sample leases, contracts and agreements may also be had? Copies of the state laws relating to aviation are generally available as are copies of the regulations, zoning act and aeronautical code. As a rule, files carry detailed information concerning every airport in the state.

Make your needs known! There might be an answer awaiting your request.

Northwest Airlines to Use Atkins Relative Danger Light

Northwest Airlines is conducting a service test of a new type anti-collision light on one DC-6 airplane.

This new light, known as the Atkins Relative Danger Light, is installed on the *top* of the fuselage; a standard Grimes light (identical to the Grimes light on AA airplanes) is installed on the bottom of the fuselage. (See *Hi-Intensity Aircraft Lighting*—SKYWAYS, March 1956.)

Rigid Auto-Pilot Minimums Opposed by ALPA and CAA

Recently all the Air Line Pilot Association's council safety chairmen were asked whether or not they favored the CAA establishing minimum altitudes at which automatic pilots and approach couplers should be used. As a result of this study ALPA sent a letter to the CAA objecting to the establishment of rigid operational minimums for automatic pilots and approach couplers. The main parts of this ALPA letter are as follows:

"Our air safety representatives that have reviewed this subject believe that the operational minimums used with the subject equipment should be determined by the pilots and operators and should not be set by rule or regulation. The procedure for using automatic pilots and approach couplers, of course, will change as the reliability and acceptability of the equipment changes. They further believe the CAA should take this opportunity to transfer some responsibility to industry on this matter.

"ALPA believes there is definite need for the automatic pilot criteria being contained in CAM 4b so that proper design limitations and airworthiness requirements can be established. These rules should control the limitations of the equipment, and permit the operators and the pilots to determine the operating conditions under which they will utilize the automatic pilot system.

"We do not believe it is desirable to place operating restrictions on the use of this equipment for the following reasons:

1. Experience level in the use of approach couplers by all operators is low.

2. In cruise and climb present terrain clearances should remain.

3. Altimeter variations with present aircraft and future aircraft preclude reducing present climbing and cruise margins with the use of automatic pilots.

4. The operational use of the approach coupler should be revised as experience and reliability of the device is demonstrated. CAA rules should not be used to hasten or deter the most efficient use of the equipment.

5. Present landing minimum rules are quite complicated. Additional operational limitation rules for approach coupler use would further complicate the minimum rules."

The CAA agreed with the ALPA position on this subject.

NASAO Requests Frequency For Air-Ground Telephone

C. A. Moore, president, National Association State Aviation Officials, recently announced that a resolution, adopted by NASAO's Board of Directors, had been forwarded to the Federal Communications Commission, requesting allocation of a suitable frequency in the aeronautical band for air-to-ground telephone communications. This was compared to the present ship-to-shore telephone service.

Moore stated that the American Telephone and Telegraph Company and affiliated companies would be requested and encouraged to install and operate the ground facilities and equipment throughout the U. S. necessary to provide efficient air-ground telephone service; and the Civil Aeronautics Administration and industry associations would be asked to actively assist in the establishment of this service.

NBAA is coordinating with NASAO on this matter as well as urging the adoption of a "special service" frequency (VHF) for non-safety communication use. RTCA Special Committee 56 is currently studying the problem.

Small Aircraft Warned Of Large Aircraft Hazard

With the construction of Air Force bases around the nation, along with implementation of more jet interceptor aircraft at various joint use civil-military airports, attention is drawn to the possible hazards to small aircraft flown in the wake of jet and larger propeller driven aircraft, "Small aircraft" includes all business and private aircraft smaller than those generally used for air transport use.

Four major hazards must be considered when operating small aircraft in the vicinity of large or high performance aircraft; wing tip vortices, jet engine blast, sonic booms and collision.

Wing Tip Vortices are formed in the wake of a large airplane. These vortices have been identified as the greatest potential hazard, except actual collisions, to small aircraft flown in the vicinity of large airplanes. Adverse wing tip vortices also can be generated by relatively small heavy aircraft, such as jet fighters. Business pilots should consider the following facts about wing tip vortices: (1) Severe vortex turbulence has a duration of from 30 to 60 seconds (1 to 3 miles) after the passage of the large airplane which caused it, and may persist much longer under favorable conditions, (2) The roll effect of a trailing vortex from a large airplane, either propeller driven or jet, can exceed the aileron controllability of a small airplane flying parallel to it, (3) The vertical gusts encountered when crossing laterally through trailing vortices behind a large airplane can impose structural loads as high as 10 G's on a small airplane flying at a high angle of attack (Note: 10 G's means ten

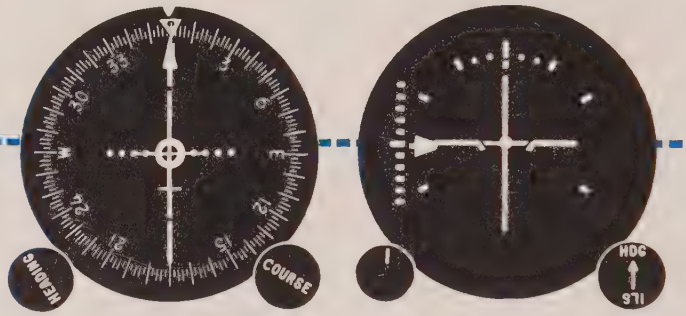
(*Continued on page 44*)

CAPITAL AIRLINES REPORTS . . .

78,198,000

PASSENGER MILES OF TROUBLE-FREE SERVICE

WITH *Collins* INTEGRATED FLIGHT SYSTEM



COURSE INDICATOR APPROACH HORIZON

Write to the sales office nearest you for new Collins Integrated Flight System four color brochure.

Mr. Earl Raymond, Supervisor, Instrument and Electronics, says:

"In 78,198,000 passenger miles, no time has been lost because of unscheduled removals of Collins Integrated Flight System.

"During the period our IFS equipped Viscounts have been in service we have had 751 ILS approaches without a single missed approach.

"We have been thoroughly pleased by the unsurpassed reliability of the components of the Collins Integrated Flight System."

Capt. Ralph Read, Chief Pilot, says:

"The Course Indicator's graphic presentation makes for easy approaches during low visibility — convenient to set up and simple to understand.

"Easy to detect pitch and bank errors; easy to cross-monitor; less chance of missetting.

"In heading function, Approach Horizon makes enroute flying less tiring.

"Use of Course Indicator while 'holding' reduces fatigue.

"Automatic cross-wind correction simplifies ILS steering.

"Use of Heading Marker and Steering Needle makes radar flying more precise.

"During training, pilots consistently make more accurate ILS approaches than with previous equipment — definite improvement from the very beginning."

Collins CREATIVE LEADERSHIP IN AVIATION ELECTRONICS

COLLINS

COLLINS RADIO COMPANY, 855 35th STREET N.E., CEDAR RAPIDS, IOWA • 1930 HI-LINE DRIVE, DALLAS 2 • 2700 W. OLIVE AVENUE, BURBANK • 261 MADISON AVENUE, NEW YORK 16 • 1200 18th STREET N.W., WASHINGTON, D.C. • COLLINS RADIO CO. OF CANADA, LTD., 11 BERMONDSEY ROAD, TORONTO 16, ONTARIO • COLLINS RADIO CO. OF ENGLAND, LTD., SUNFLEX WORKS, COLHAM MILL ROAD, WEST DRAYTON, MIDDLESEX, ENGLAND

NAVICOM

(Continued from page 22)

also offered with 90-channel transmitter capacity and 90 channel crystal-controlled receiver. The addition of 19 crystals to this unit increases the transmitter capacity to full 360 channels.

The 1016 can be controlled by a single channel selector mounted anywhere on the instrument panel if Simplex operation is desired—i.e. transmission and reception on the same frequency. If it is desired to transmit on one channel and receive on another (cross-band communication) the 1016 can be installed with separate transmitter and receiver frequency selectors mounted side by side.

The crystal-controlled receiver permits precisely defined 50 kc separation through the entire range of channels from 108 to 135.95 mc.

The transmitter operates from 118 to 135.95 mc providing communications on every channel assigned for such purposes along civil airways.

Mechanical design and electrical circuitry have been engineered to permit addition of VOR and localizer functions as well as other components of a complete VHF navigation system now under development at Narco.

The Narco antenna has uniformly high radiation through the entire transmitter range of 118 to 135.95 mc.

Both the receiver, which is a double super-heterodyne, and the transmitter include crystal-saver circuits providing multi-channels from each crystal. Remote channelling using "double-torque" step turning motors is provided in both units. The R. F. circuits are automatically tuned to the selected channel. The high gain audio system, which includes a peak limiter, produces unusually effective modulation—equivalent to considerably high power output. All R. F. circuits can be metered from pins available at a front panel jack. Sidetone is derived from the modulated carrier and thus serves as a complete monitor.

The Sapphire 1016 is priced at $2490 for the basic unit or $2900 for unit with full 360 channel transmitter, 560 channel receiver capacity.

CAB Proposes Special CAR To Aid Near-Miss Reports

In a praiseworthy effort to put preventive research ahead of purely punitive enforcement, the CAB has announced a proposed Special Civil Air Regulation to assure pilots that in the submission of voluntary near collision reports, whether made anonymously or not, the identity of the pilot making the report to the Board will be held in strict confidence. The report will not be used to initiate, aid or abet any enforcement, remedial, or disciplinary proceedings under the CAR.

The purpose, of course, is to acquire first-hand valuable basic information pertaining to these situations with a view to reviewing air traffic control procedures, separation standards, and the need for revision or addition to air traffic control and high density area rules. Basically, the problem remains one of learning in advance to cope with the expected increase in air traffic without a comparable increase in the collision hazard.

It should be noted that the regulation is designed to bring to light for study the currently "unreported" near-misses which are believed to outnumber the publicly-observed and reported incidents which sometimes lead to either remedial action, disciplinary proceedings or both. The regulation provides that the voluntary reporting, while not self-incriminating, will not preclude such action in the event that the same information comes to the authorities through other sources. While this may prevent hurried "voluntary" reporting by pilots primarily for the hope of implied immunity, it may also defeat the purpose altogether by a tendency for cautious pilots to "let sleeping dogs lie!"

Study Use of Flares For Night Forced Landings

The tremendous increase in the use of single-engine and light twin engine aircraft since World War II, by executive and industrial pilots has accented a problem that probably has been discussed more often in hangar flying sessions than any other with the exception of IFR flying in these aircraft.

To get the necessary utility out of these aircraft to warrant their investment as a business or working tool, they have had to be increasingly exposed to after-dark flying. The problem, which developed from this flying, is definitely not limited to single-engine aircraft.

Hence, the study completed this past year by the University of Illinois Institute of Aviation in collaboration with the International Flare-Signal Division of Kilgore, Inc., on the use of parachute flares as an aid to the execution of night forced landings is not solely interesting or pertinent to single-engine pilots.

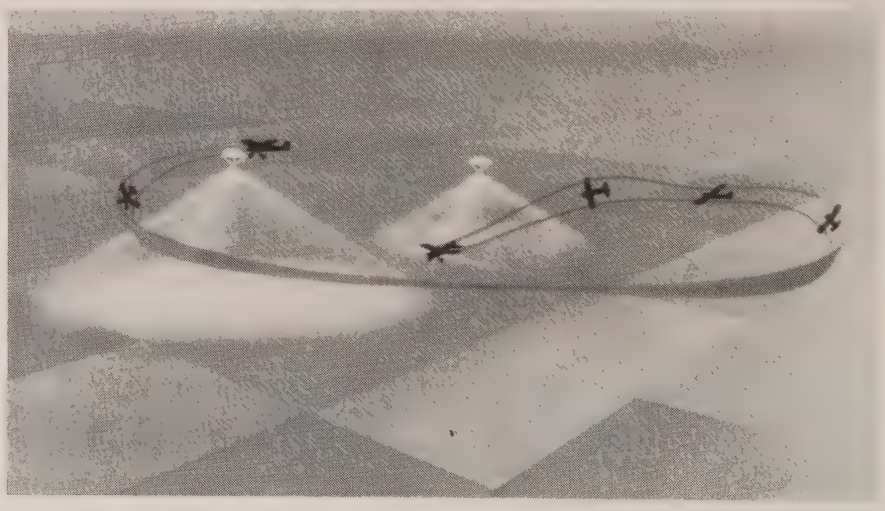
The investigation took the form of both competent discussion and actual flight operations. Questions for which answers were sought were:

1. How much area and how much detail can be seen from altitude using a flare for illumination?
2. What are the best altitudes for using such flares?
3. What type of flight pattern would be best to obtain optimum assistance from the flare?

A series of simulated night forced landings using a variety of aircraft and pilots of widely-diverse experience was the basis of the very complete and clear report.

Conclusions were to the effect that both the one minute pistol and the one and one-half minute electrical parachute flares can be used to distinct advantage for night forced landings, with the latter obviously having the advantage in this situation over the shorter duration flare. Also, that the pilot's ability to make safe and efficient use of the flares varies in proportion to his knowledge of, and prior preparation in the use of, the particular flare and the airplane type to be used.

The report is embodied in Bulletin No. 17, published by the University, located at Urbana, Illinois, and merits the acquisition and thorough study by every night-flying pilot of the foregoing class of aircraft.



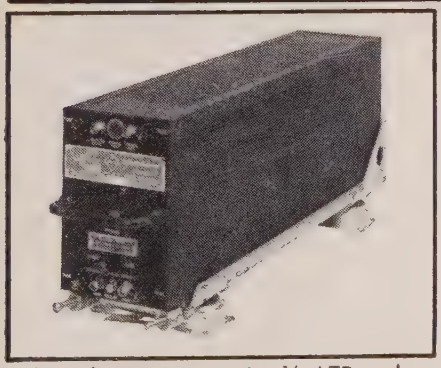
AIRCRAFT *makes 360-degree overhead approach which can be modified to a 180-degree overhead approach and still allow flare to be fired at extreme upwind end of selected field.*

announcing . . . for airline and executive aircraft use

THE *Sapphire* 1016

90-360 CHANNEL VHF TRANSMITTER

90-560 CHANNEL VHF RECEIVER



Complete unit occupies ½ ATR rack, weighs 24¾ pounds. Unitized construction permits quick separation of transmitter, receiver and power supply units for easy servicing.

Narco introduced its airline-quality Sapphire line of navigation and communications equipment with the Narco DME...Now comes the Sapphire 1016 VHF communications unit designed to meet the maximum channel requirements for airline and executive aircraft use.

The Sapphire 1016 includes a high-powered transmitter of 90 to 360 channel capacity. It has a crystal-controlled receiver of 90 to 560 channel capacity with precisely defined 50 kc channel separation available throughout the entire range from 108 to 135.95 megacycles.

The Sapphire 1016 meets latest CAA TSO requirements for airline use. While its performance and channel capacity match the finest airline-type equipment available, the 1016 is offered at only a fraction of the cost of comparable equipment. See your Narco dealer or write for full details.

narco NATIONAL AERONAUTICAL CORP.
AMBLER, PENNA.

FUELS-OILS

Features and Facts Pertinent to Successful Flight Operations

Additive Difficulty Cited In R-2800 Engine Sections

Operators of executive aircraft powered by the big Pratt & Whitney R-2800's may experience manifold pressure troubles if Santolene "C" is used as a corrosion inhibitor in the plane's fuel. The highly regarded inhibitor has been a standard additive in fuels meeting government specifications for some time.

Recently, however, the Air Force Petroleum and Chemicals Quality Control Laboratory issued a report showing that Santolene "C" and the R-2800 don't seem to mix. After about 500 hours of operation on fuel with the additive in it, deposits were noted on intake pipes and blower sections resulting in great difficulty in maintaining manifold pressure at higher power ranges.

The deposits, it was found, were caused by a lead salt formed from the "C" inhibitor at high temperatures. Many fuel companies have taken steps toward omitting the inhibitor from av-gas.

For R-2800's that may have encountered this difficulty, here is a method of correction: Replace blower throat primer fitting with one having ⅛" ID. Connect ¼" hose with end in bucket of 4 gals. orthodichloro-benzine. Run engine at lowest manifold pressure setting for 10-15 minutes. Large quantities of smoke from exhaust during process. Stop engine, change all spark plugs. Fly craft immediately after this to clear deposits before they re-harden. Manifold pressure should increase by one to six inches as result.

New Lightweight Fire Unit Checks Heat, Sounds Alarm

Weighing under three pounds and appropriate to a wide range of planes in the business fleet, a new fire detection device announced by Walter Kidde & Co. is said to be the only unit available that gives both an immediate nacelle overheat signal to report potential danger and, second, a fire alarm should the fire develop.

The device operates on both the fixed temperature and rate-of-temperature-rise principles. In order to prevent false alarms due to sudden operational temperature rises, as when the engine is started, the unit permits overheat or alarm signals only after the maximum normal temperature has been exceeded in a nacelle. A fire during starting, however, causes this condition to be reached quite rapidly and a fire alarm is sounded.

The device comprises two units. 1. A fire sensing element that comes in lengths up to 20 feet and is fitted with male and female couplings which eliminate interconnectors. The elements are .090" diameter, and consist of an insulated conductor in inconel metal tubing. 2. A control unit employing transistors is the second part of the detection device.

Operating ranges for the unit are set according to any specific plane so that slow but dangerous nacelle heat rises are signalled as well as actual fires which trigger a separate alarm. The fire alarm signal, however, always overrides the overheat signal.

Fire detection time, according to the maker, is well under five seconds and the unit "clears" from the fire signal in less than 30 seconds.

New Style Metal 'O' Rings Offered as Seal Replacements

Operators of executive aircraft who are looking for something new in the way of sealers for fuel and hydraulic lines, are offered a line of thin-walled, tubular metal "O" rings by Advanced Products Co., of North Haven, Conn.

Of particular interest to the business fleet is the fact that Advanced Products is stressing the availability of its technical representatives at most major aircraft centers in the country. The company hopes to give on-the-spot and immediate advice and service to the individual operator in that way.

The metal "O" rings, which fit between line flanges to provide a low-load static seal in fuel and hydraulic lines, have these prime advantages according to the maker: "won't deteriorate or break down in contact with most chemicals, oils or greases. In storage they retain their flexibility and resilience indefinitely, regardless of temperature or atmospheric conditions."

The standard material being used for the rings is thin-walled stainless steel tubing from a stock of titanium-stabilized alloy which prevents carbide precipitation during welding and retains high corrosion resistance in the weld area.

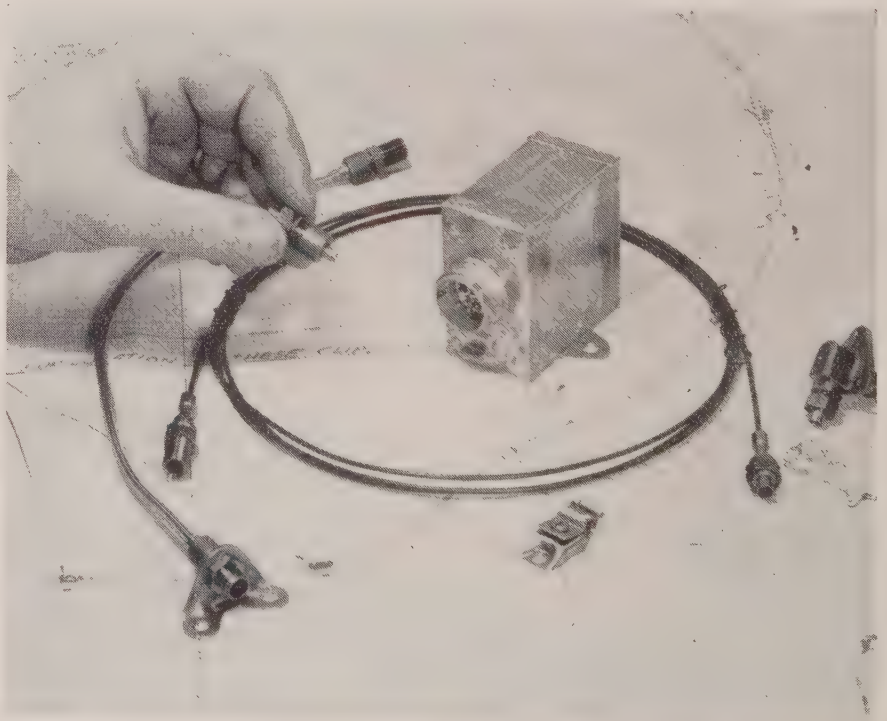
For lines in which corrosion is not much of a factor, carbon steel with silver or cadmium plate or Teflon or Kel-F coatings are offered.

Prices and advice about any particular aircraft are available from the Advanced Products Co., P.O. Box 75, North Haven, Conn. Addresses of local air center representatives also will be supplied.

A Hint to Operators Where Sand is Problem

Fixed base and executive plane operations in parts of the country where blown sand is a problem (and this touches many an oil operator in the great southwest) may find that the gate valves of exposed fuel or other base installations are prone to collect sand more than most objects. The reason, of course, is that the screw stems must be lubricated and yet, the lube itself is a perfect catcher of grit and sand.

George Air Force Base's fuel crew has come up with this solution: Paint the screw stems lightly with aluminum paint. This will lubricate the stem without providing an adhesive agent for the sand. As a bonus, the appearance is improved too!



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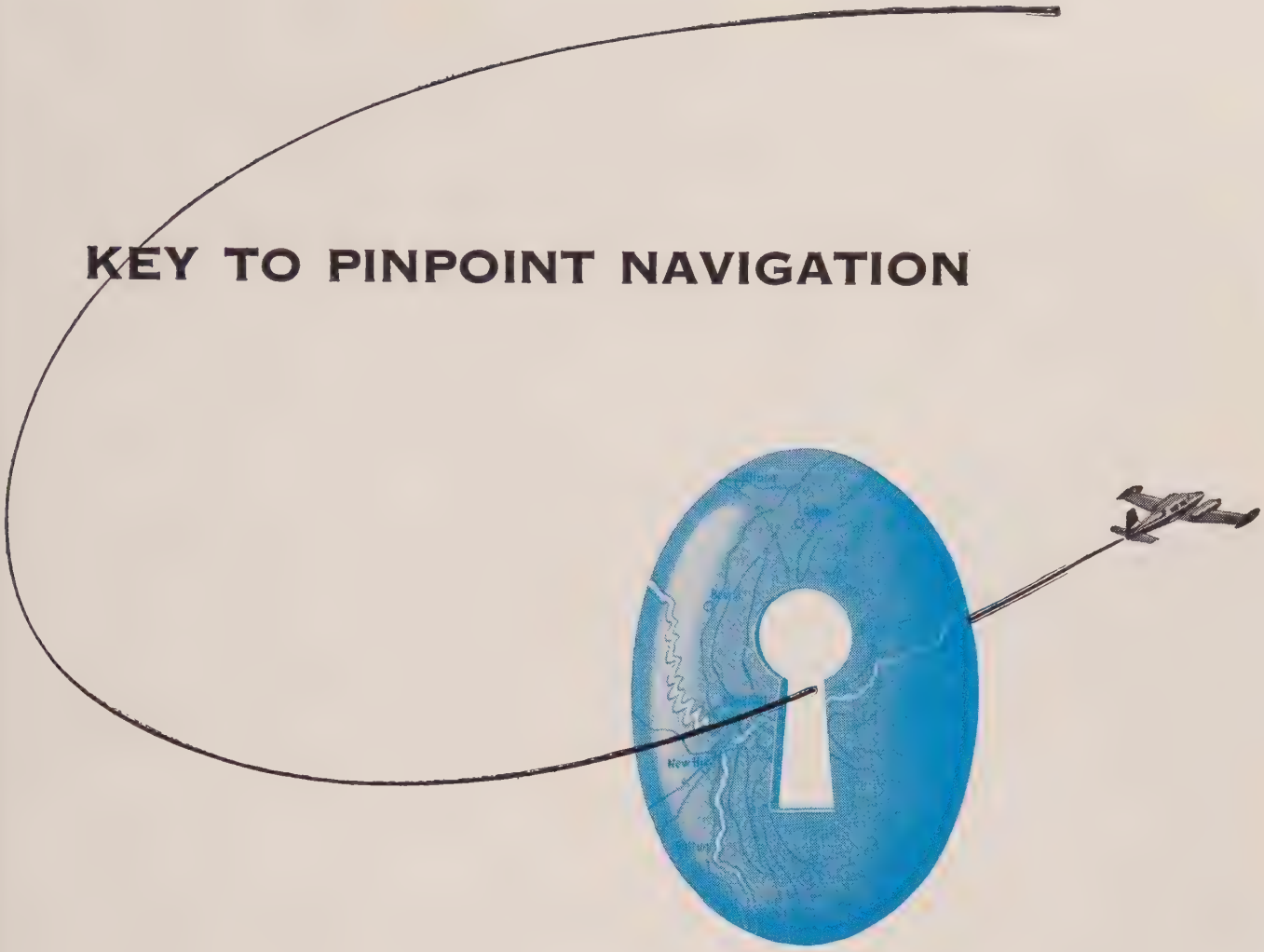

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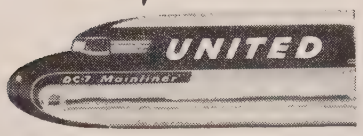

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Round Table

(*Continued from page* 16)

transport aircraft at that time was the military surplus ARC-1, which is basically a ten-channel unit. It was first modified to provide 20 channels and later 50 channels. RTCA SC-56 began its studies about the time the 50-channel modification was started.

"The first task of SC-56 was to provide some immediate relief of the burden imposed on air traffic control by having only eight VHF air-ground communication channels. The number was increased to 12 at that time. A year later, a plan was approved for the use of approximately 28 channels. This was the greatest number which could be made available with the ARC-1 equipment, although it was apparent then that many more channels would soon be required for air traffic control. So, in the report which set forth the plan for the 28 channels, it was noted that the spacing between adjacent channels would probably have to be reduced from the 200 kilocycle limitation of the ARC-1 equipment to 50 kc. This would require new equipment which would theoretically, provide means for obtaining four times as many channels. A plan showing how the 50 kc spaced channels might be used was also included in the report."

Frank C. White: *"Was any estimate made of when this war surplus VHF communications equipment would be replaced, and what the replacement equipment would be? What does RTCA recommend?"*

Harold Tanke: "The recommendation was that the war surplus equipment be replaced with 50 kc equipment by the end of 1953. However, this program was delayed. I understand that the new equipment is now installed in most of the airline and the larger business aircraft."

Frank C. White: *"I wonder, Mr. Petry, if you could give us a summary of how the airlines stand on replacing the present equipment with its insufficient channels."*

C. A. Petry (*Aeronautical Radio, Inc.*): "I think the time table was perhaps a little too tight so far as procurement of new equipment was concerned. Number one, there hasn't been a variety of suitable equipment available until rather recently. Also, other equipment was coming along and everyone seemed to want to take a look at the new designs before they made substantial dollar commitments. But the program has been coordinated and I believe the airlines are fully behind it. The time table now calls for all airline aircraft operating in the greater New York area, meaning the whole Northeast part of the United States, to be equipped by August, 1956. It looks as though they will make good on this schedule. The situation today is that the majority of airline aircraft now carry the new multiple channel equipment suitable for operation on frequency channels spaced 100 kc. Much of it will operate on 50 kc spaced channels. We can now begin to use some of those channels. On the operational control side of the picture, we are already using a number of 100 kc spaced channels, and with full implementation we will—theoretically—have twice as many channels."

Frank C. White: *"I wonder, Mr. DuBuque, if you would tell us whether the business aircraft owners and operators understand the need for equipment that will operate on 100 kc channels. Perhaps, at this point, we should explain that when we say 100 kc channels we mean, for example, the use of channels 118.1, 118.2, 118.3, 118.4 and so on. Today we are using channels every 200 kcs. For example, 118.1, 118.3, 118.5. Is there a general understanding among business aircraft operators that this program is necessary and that by this fall there will be an expanded requirement for the use of radar procedures, direct center communication, etc., and that equipment of modern design will be needed?"*

Jean DuBuque (*National Business Aircraft Association*): "Yes, Frank, there very definitely is a need. Of course, the requirements of a business aircraft operator, particularly those who fly multi-engine aircraft, are similar to those of the airline operators. We are greatly concerned about other problems that are arising in the communication field at the present time. In the high density areas, as Walt Jensen pointed out, there is an annoying overlap of communications. Another problem involves one high-powered transmitter cutting in on another of lower power and drowning out communication. There also is too much repetitious talk on certain critical channels."

Frank C. White: *"We will want to ask the equipment manufacturers if they are prepared to meet this demand for new equipment, but first I should like to ask Mr. Karant of the Aircraft Owners and Pilots Association if the light plane operators will be able to take this problem in their stride. As Mr. Tanke pointed out, it was planned in the past to confine this type of aircraft to the general band of 122 mc for operation with approximately five frequencies. It seems to me that if we are going to encourage these small plane operators to use additional frequencies there might be a burdensome equipment problem. How do you view this Max?"*

Max Karant (*Aircraft Owners & Pilots Association*): "Well, as many of you here know this has been a hair raising problem for us for a long, long time. We have now progressed to the point where we have almost developed ourselves out of the sky. It gives me goose pimples to listen to the airlines for example say, 'Boy, at last we are going to get rid of this junk which has only 50 channels.'

"I know what the problem is; it's a very real problem. We have become so scientific that we have a communications channel for almost everything. I would not be surprised to see special channels for the left side and the right side of the Potomac River. Also, a special channel for crossing a white line on a runway and one for a yellow line on the runway. As you know, people talk very knowingly about a 1,700-channel communications set. This is dashed off like a bottle of buttermilk. I don't know what the manufacturers are going to come up with. Of course, if they can give us one that weighs one pound and costs one dollar, I am sure they'll sell it."

Frank C. White: *"I am sure that you are joshing about the one pound and the one*

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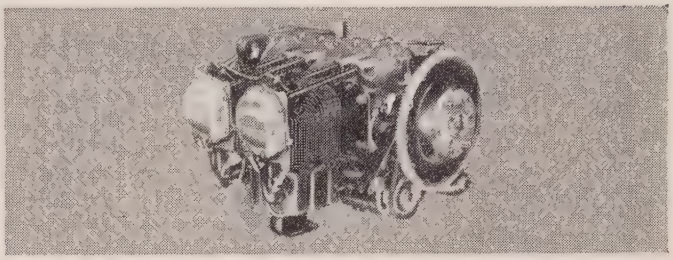

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dollar. What is a realistic price? What are you paying now, approximately?"

Max Karant: "It depends upon what manufacturer you are talking about. I don't know how much a pound Mr. Collins charges or know how much a pound NARCO charges. I can tell you that a very widely used piece of NARCO equipment today weighs 18 pounds complete and sells for about $1,000 installed. It has eight transmitting channels, which are not nearly enough, and it has a tunable receiver.

"Several thousand aircraft owners have to realize that if you want to talk to Joe you have to have a frequency that spells Joe, because Joe is no longer around in a central station. These companies have developed special communications equipment. There is one on the market for light planes that has 25 or 27 channels.

"As a matter of fact, if I go into the New York area, I have serious doubts in my mind whether, even if I wanted to use all the facilities available, and talk to the man in Room A or the man in Room B, that I could get him. I don't know where this is going to end up. I think it will be so scientific that we may all end up talking to ourselves. Whatever you come up with, we always have to point out that with all the airplanes we have in the airspace now, there are more going in all the time. The weakest link in this chain is always the small airplane. The owner has to pay for all this stuff out of his own pocket. So you just can't keep putting in channels because it sounds like the proper thing to do. The average guy can't afford it. Where it does give him service he badly needs, he buys it. He buys it in very substantial quantities. But we are reaching the point now where there is almost no more room. Take a small airplane that weighs, as in my case, 2500 pounds. Pretty soon we will have to be towing a glider carrying our communications equipment if this continues. I don't know where it will end. People have ideas for all sorts of new equipment. I would like to hear from the manufacturers because this problem intrigues me very much."

Frank C. White: *"We want to turn to the manufacturers at this point. Since we are talking about the light plane field, I wonder if we might ask NARCO to comment. We have a real need for modern equipment that is light, inexpensive and provides enough channels. Is there a possibility of doing this?"*

G. F. Quinby (*National Aeronautical Corp.*): "Frank and Max, I think the aircraft radio manufacturer's job is to fairly interpret the advancing state of the art so as to give the user more radio per dollar or per pound or however you want to measure it. We try to do this, and we find that in dollars for performance you are quite a bit better off than you were ten years ago. Whether, in the future, the Bonanza operator, to do the job that the airplane is designed for, should have the hundreds of channels the air carriers need is an operational question the manufacturer had best stay close to. As Max mentioned, we have a 27 channel light plane radio in production. I am proud to say that we cannot keep up with the demand for that radio. *People want to use a lot of channels.* This is a rather surprising thing to us because it supersedes a 12 channel radio that we retired some six months ago, and the popularity of the 12 channel radio was only so so. Twenty-seven channels is selling like crazy. Some place along here you'll reach a limit where the people that buy radios will quit paying their money and carrying the weight around."

Frank C. White: *"Apparently there is no specific indication of what that limit is. Do you care to make a guess?"*

G. F. Quinby: "All I can say is that there is no limit in sight."

Frank C. White: *"It seems to me that the more channels you can sell the more money you can make."*

G. F. Quinby: "Up to a certain point. I think that there is a point of diminishing return some where, but it is not one of weight. As you know, we are using subminiature crystals now. Instead of crystals the size of your thumb, they are about the size of your thumb nail. I think the limitation might be one of cost."

Frank C. White: *"Walt, do you have a comment?"*

Capt. Walter A. Jensen: "Yes, I'd like to keep one thing straight. A statement was just made that 'people seem to want to use a lot of channels.' Probably what is really meant is that people are being forced to use a lot of channels and need the equipment to do it. I'd like to mention the fact that we have a serious complaint in that we have to change frequencies too often. This is a burden on the pilot; it distracts him from his other duties. This problem came about because, as traffic increased, there was no other answer when a communications channel got congested but to divide it and set up two channels. That, I think, is going to have to end sometime.

"On a flight out of Philadelphia not long ago, the pilot was on about eight different channels within eight to 10 minutes after take-off. He was not at all happy. If anybody has any ideas as to how to straighten out this constant changing of frequencies, I would like to hear them."

Jean DuBuque: "Perhaps the day will come when Max will not have to use his transmitter or receiver, but will just push a button and his problem will be handled automatically. I assume that is what Max would like to have ultimately.

"I would like to ask NARCO or any of the other manufacturers present a question. Are there future plans to make it easier to insert a crystal or to make available additional channels for the operator whenever he needs them without having to build them into the box?"

Frank C. White: *"I believe this question suggests that the pilot would plan his flight by determining from maps and RF charts—or whatever other publications are available—what frequencies he needs. Then he would be able to select, let's say from a total of 20 channels available in the airplane, the specific frequencies needed for th flight. I know that this isn't the sort of solution the airlines are thinking about. But is this something that anyone has considered for possible application to the light aircraft field?"*

G. F. Quinby: "Well, just as a quick answer to that one, we have considered giving more flexibility to the pilot for his communications by that method. We don't like it; it has a lot of technical draw backs and, I think, operational draw backs."

Frank C. White: *"What do you suggest then to provide adequate frequencies?"*

G. F. Quinby: "I think we will be able to provide adequate frequencies. If VFR operations move toward the use of more channels than we provide, and our competition comes up with a plan that seriously presses us, we'll come up with a better plan which will have all those crystals inside the radio instead of in the glove compartment."

Frank C. White: *"There are a number of manufacturers here and we all realize that this is a very competitive market. One of its most competitive phases is the airline market because of the tremendous requirement for communications, for operational controls as outlined by Mr. Petry. We need communications for traffic control, for radar, weather and other advisory services, and for operational control communication.*

"Simultaneous communication for these many functions is a terrific equipment problem. Is this problem beyond solving or is it something the manufacturers can take in their stride? Bob Dutton of Collins, how do you stand on this?"

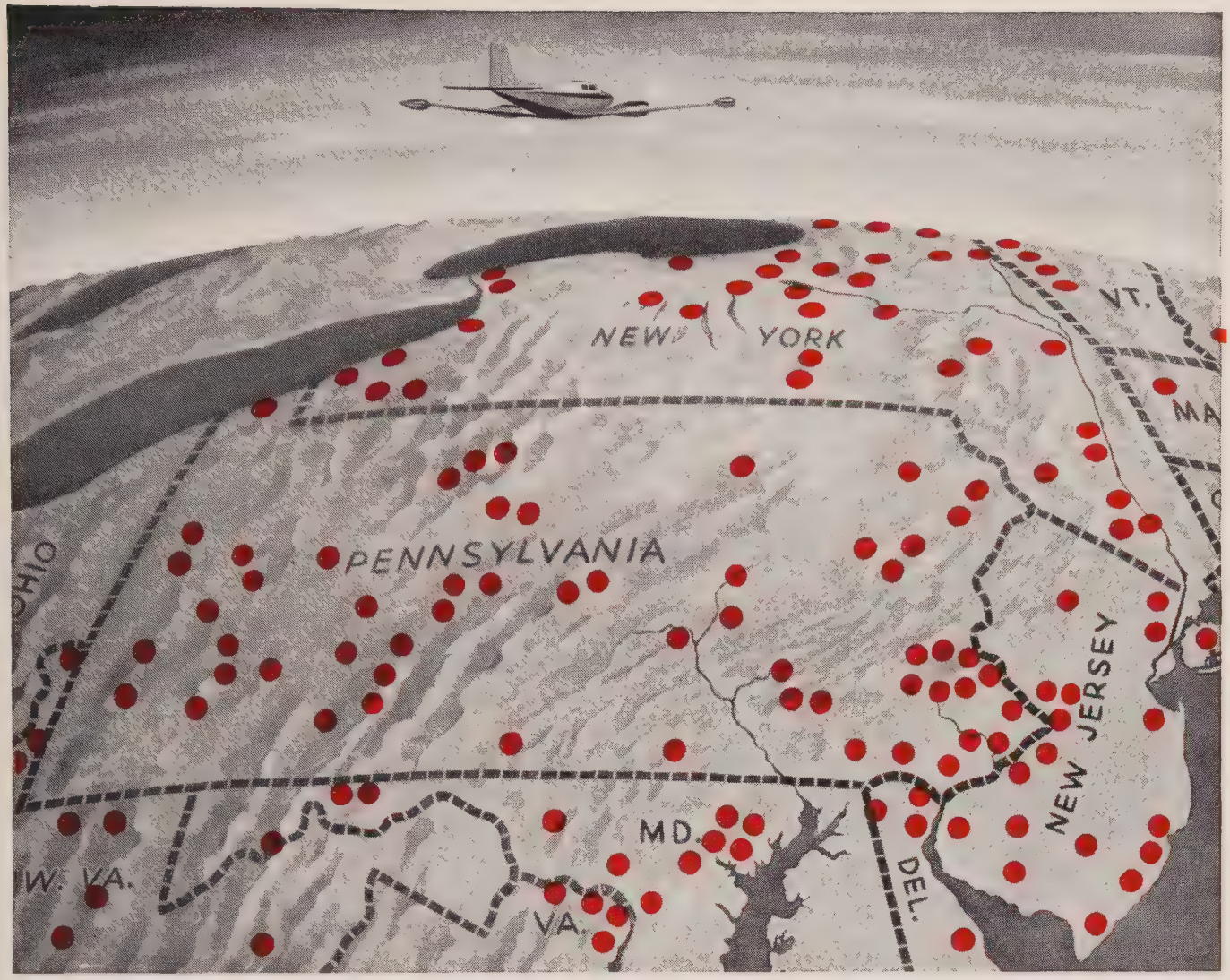
Robert P. Dutton (*Collins Radio*): "No, it's not incapable of solution, Frank. We've talked here so far about channels, pounds and dollars. The only problem is dollars, when you get right down to it. As far as channel availability is concerned we already have passed the 100 kc channel-spacing phase and have been in the 50 kc channel-spacing phase on airline equipment for some months now. Our next attack must be on the weight problem in that 50 kc equipment.

"This is perfectly capable of solution, as transistors and other miniaturized components are now developed to the point where we can put them to work—and we are. We can probably get 50 kc spacing into an airline-quality receiver not weighing more than 10 pounds. So channel capacity and weight can be resolved, but we can't get the dollar figure down to the one buck that friend Max here has mentioned."

Frank C. White: *"I wonder if Bendix would like to comment on how they stand on equipment that will do this job."*

C. I. Rice (*Bendix Radio Division, Bendix Aviation Corp.*): "We have modern 360 channel equipment in production. For Max's benefit this is the standard number of channels that we talk about today for airline and the larger business aircraft. It is 50 kc equipment. Most airlines are planning dual installations of this equipment in order to have the operational flexibility of two systems, as well as the advantage of an auxiliary system in the event of failure. We feel that this is very sound planning when you consider IFR aircraft. We are constantly trying to reduce the size and weight, of course, in order to make the equipment more compatible with the weight and space limitations of todays' aircraft, whether it is a smaller business aircraft or the larger airline type. We feel that the performance standard is high and that all 360 channels will be usable.

"Insofar as the elimination of interference from adjacent channels is concerned, we are sure you can actually get



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good 360 channel performance with the equipment we presently are manufacturing. In addition to the VHF communications equipment, we have designed and have in production an auxiliary type of equipment called 'selective calling equipment.' The principal purpose of this equipment is to provide for the calling of aircraft without aural monitoring in the cockpit. This is particularly useful when you have to monitor ATC and company channels."

Frank C. White: *"I'm sure that this is attractive from the pilot's viewpoint. The automatic selective calling device monitors the company operational control channel. When the company wants the pilot, a light goes on in the cockpit. The pilot knows that the dispatcher back at the home base wants him. What are Wilcox's plans in the aeronautical communications field?"*

Jay V. Wilcox (*Wilcox Electric Company*): "I'd like to preface my remarks by saying that our company is interested in the private flier, the business flier and the airlines."

Frank C. White: *"You have a triple-edged sword then, Jay."*

Jay V. Wilcox: "We have made quite an effort in the last three years to design new equipment that would meet a requirement that we felt was not met in the past. In analyzing the requirements of the small aircraft, medium large aircraft and the very largest of airline aircraft, it becomes evident that space and weight are still important. We also recognize that in the smaller aircraft reliability of equipment is just as important as it is in a DC-8. Such equipment should meet all the requirements for operation under the most rugged environmental conditions, and should be completely CAA certificated. Therefore, our company has recently announced the CANARI System. The CANARI encompasses nearly all of the communications and navigation equipment required by an aircraft today, is lightweight, small in size, and is completely certificated."

Frank C. White: *"How do you stand on making deliveries this year in the VHF communications equipment field? We are particularly interested in that."*

Jay V. Wilcox: "In the CANARI System we have a new lightweight VHF transmitter and receiver. The transmitter has 360 channels between 118 and 136 megacycles, and weighs 13 pounds. The receiver has 560 channels between 108 and 136 megacycles, and weighs about eight pounds. Since crystal saver circuits are used, all channels are available in the equipment as it comes from the factory."

Frank C. White: *"Is Max going to get this for his dollar, Jay?"*

Jay V. Wilcox: "Not quite. The equipment is priced competitively and will be available by this summer."

Max Karant: "About how much?"

Jay V. Wilcox: "No comment. Watch the advertisements!"

Frank C. White: *"Cap, do you have a comment here?"*

C. A. Petry: "Yes, I feel several points have been made here that would indicate there has been reluctance to procure new equipment. Perhaps that should be clarified. NARCO has indicated, for example, that they cannot meet the demand for the new light plane equipment with 27 channels. I believe all of the manufacturers have had difficulty in meeting the demand for new equipment. Shortly, perhaps, they will be able to meet the demand and there will be a variety of equipment to choose from. But I believe that the big problem does not arise because of equipment limitations in or for new aircraft. There is a reluctance to retrofit old airplanes. New aircraft come out with the most modern equipment. Radio equipment represents a very small percentage of the cost of the airplane and everyone is interested in reliable, safe, lightweight, multi-channel equipment. They want the best they can get for a reasonable price when they are buying a new airplane.

Also—here—we will have to throw a bouquet to the business aircraft. They are ahead of the airlines in procurement of modern radio equipment, but it is primarily due, I think, to the fact that their operation is a rather new one. They are fitting out their aircraft to do a job, a new job, whereas the airlines are still thinking about replacing the DC-3 and the DC-4. Not only that, but business has been good and there is always great opposition to taking airplanes out of service, out of the normal shop schedule, to put in new gear. That means, in order not to involve loss of revenue, you probably wait until other overhaul schedules call for the airplane to be out of service before you can rewire it, install new antennas, new racks and all the other things that are necessary for modern gear. On a fleet basis this takes time."

Frank C. White: *"Mr. Nelson, could we hear from you at this time on the problems of installing new electronics equipment in executive aircraft?"*

R. B. Nelson (*Technical Enterprises Ltd.*): "My company's interest in this subject stems from our business of designing and installing communication and navigation systems in business aircraft and, we hope, in airline planes.

"As Mr. Petry has just pointed out, a good many business aircraft are equipped to a more current standard than has been achieved by a lot of airline machines. This obviously is due in some part to the economic conditions imposed on airlines as compared with those governing the average business aircraft operator. Then too, a lot of business aircraft have been acquired recently and are therefore able to take full advantage of the technical developments currently available. I also believe that the type of operations carried out in business flying demand, wherever possible, the maximum range of facilities to enable the aircraft to be used to its best advantage. The business aircraft should not be unduly limited either by weather or lack of equipment in order that it may take care of its owner's transportation needs.

"These facts are undoubtedly already well known to all you gentlemen, but I have mentioned them in order to give a background to a statement that has to do with the growing requirements for combining the need for the highest standard of flexibility and reliability in equipment with the problem of physically getting the equipment into the customer's airplane.

"In solving this problem, we have to give consideration to the range of equipment necessary to satisfy a given customer's operating requirements, the size and weight of this equipment, and the dollar value involved. Our experience has indicated that the second of these three problems, that is the size and weight of the equipment, is apt to be most stringent insofar as business aircraft installations are concerned."

Frank C. White: *"Doesn't this boil down to a better understanding among all users as to the benefits that are derived from modern multi-channel communication equipment? As this understanding increases and as additional radar procedures improve traffic control, there will be increased demand for better communication equipment. There will be not only a desire to replace the older equipment, but an increased pressure on the manufacturers to provide the equipment when it is needed. I want to ask Mr. Hawthorne of the FCC a question. We have been talking about more channels. This seems to me to pose a problem with regard to frequency spectrum. I know that the spectrum is a very precious resource. What is your viewpoint with regard to providing these additional channels, Mr. Hawthorne?"*

William B. Hawthorne: (*Aviation Division, Federal Communications Commission*): "It is of interest to note that RTCA in 1946 recommended that plans be made to go from 200 kc channeling to 100 kc channeling in the 108 to 132 megacycle band as the requirement for additional channels materialized. The Commission's rules make provision for the use of 100 kc channels in the band 108-126.7 megacycles and for the use of 100 kc and 50 kc channels in the 126.9-132 megacycle band. It is expected that the use of 50 kc channels in the entire band may be provided when the requirement exists for such channeling. It should be realized that going from 200 kc channeling to 50 kc channeling makes a sizable increase in the number of channels. Also, Special Committee 56 of the RTCA now has under consideration the requirements for air traffic control channels in this VHF band. It is expected that this committee's recommendations, after approval by the RTCA Executive Committee, could be useful to the Commission in connection with rule making to provide for 50 kc channeling in the 108-132 mc band."

Frank C. White: *"Would anybody else care to comment with regard to how we stand in the immediate future?"*

G. F. Quimby: "I would like to say that in connection with 'Cap' Petry's present interest in the retrofit of modern communication versus that going into brand new equipment, as near as we can make out from reasonably reliable figures our retrofit sale of this 27 channel small unit is in excess of 50 per cent of the total sales, approximately 500 units. This is partly because we took the trouble to design it so that retrofit was very simple."

Jean DuBuque: "We've discussed at great length the requirement for increasing the number of channels for communications. I would like now to ask the CAA if they have any plans that will decrease the number of channels for communications, particularly in the high density areas where there is a constant change from one channel to another. Is consideration being given to altitude assignment of channels? In other words, from zero to 5,000 and from

5,000 to 10,000, etc. Could specific channels be assigned to various altitude levels which may be used by aircraft flying between those altitudes?"

R. T. Manhardt: "The only consideration that has been given to stratification, so to speak, is, as I recall the figures, above 20,000 feet. I don't believe you would gain anything by having separate channels for the 5,000, 10,000 or 15,000 levels because you would in all probability have to change channels as you went through these altitudes. You would certainly complicate the ground problems and control setup.

"We do visualize military operations initially and later civil operations at the higher altitudes as being controlled and having separate direct communication with the controller. But I don't know of any new plans for the lower altitudes which you mention. General use of stratification is talked about occasionally but always is pushed aside as not being practical."

Frank C. White: "*Actually, we have limited sectoring in the vertical plane today. We now have low altitude control between the towers that employ perhaps the lower two flight levels, and then up to, as Dick has outlined, approximately the 20,000 foot level. But as the volume of traffic increases and the number of control decisions in consequent communications increases, the problem is magnified to the point where it becomes impossible to provide control clearances and adequate communications without greatly increasing the number of channels needed and severely complicating the ground environment. The one thing that we must continue to do is assure the users of the airspace that every effort is being made to solve the problem without requiring the provision of an unnecessary number of channels in the airplane. The pilot should not be required to change frequencies any more frequently than he does today. Preferably he should be permitted to go a lot farther and retain the same channels.*"

Jean DuBuque: "Frank, there is another matter I would like to bring up. There is a paramount need today for a VHF radio frequency to be designated by the FCC for 'special service' communication by business and private aircraft. This would be a non-safety channel which would permit pilots to call in advance for servicing, dispatching, delivering messages of an operational nature, etc. It could be assigned to authorized fixed base operators on a private station basis at most airports since it would not be installed in CAA towers or stations.

"It is NBAA's understanding that the CAA would not oppose such a 'special service' channel. We further understand that only a crystal would be required to convert tuneable-type ground radio equipment to an appropriate frequency. Airborne equipment also could be modified at moderate expense, since this channel is in the range of light equipment such as NARCO, Lear, etc.

"Since the CAA will no longer allow their facilities to relay messages not pertaining to aviation safety, and also, because of the personnel shortage and overload of work at some stations, business aircraft operators are losing valuable time and service because it is impossible to call ahead. The present use of the telephone is inadequate because of unknown delays due to weather, traffic, etc. Fixed base operators contacted so far are willing to install ground radio equipment to give additional service to their customers. This will not cost the government one cent. The airlines have had available operational frequencies for company use a number of years, so why shouldn't the largest factions of civil aircraft be allowed to handle its own business with its own frequencies?

It is, of course, possible that local interference may occur on this particular channel because of simultaneous calls from approaching aircraft. But waiting a few moments for a clear contact would be only a slight inconvenience because the messages would not pertain to safety."

R. T. Manhardt: "I think this is well worth mentioning. I believe that recognition should be given to the requirement if it is a real one."

Frank C. White: "*I think this is something that will come under active consideration, and certainly it will be weighed together with the other requirements for communication channels.*"

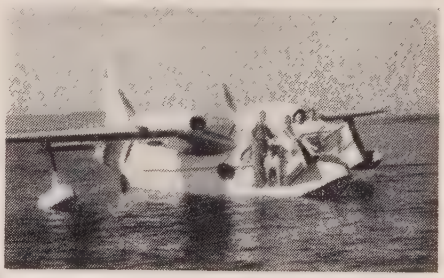
Jean DuBuque: "Frank, I'd like to add to my comment. Rather than individual organizations directly requesting the FCC to provide a channel, it would be logical to submit the problem to an organization such as the RTCA. Possibly their Special

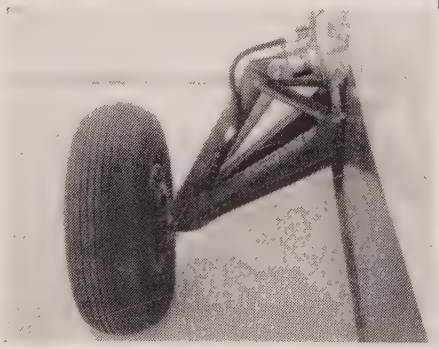
Royal
AMPHIBIAN NEWS

Notes on America's outstanding utility amphibian for business flying and charter service operation

AMPHIBIAN DESIGN OF ROYAL GULL ELIMINATES WHEEL AND BRAKE TROUBLES

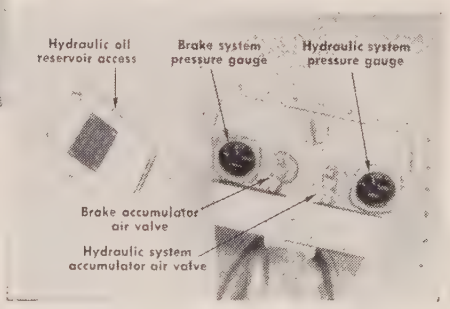
LANDING GEAR RIDES HIGH AND DRY — A feature typifying the Gull's highly functional design is the way the wheels are almost fully recessed, well above the waterline — even when the plane is fully loaded. And they're clear of all but minor spray as hull configuration precludes "porpoising." Positive locking (both up and down) landing gear has both mechanical and electrical position indicators for added safety.





SPECIALLY-DESIGNED BRAKES, SEALED WHEEL BEARINGS — Hydraulic-actuated brakes (standard for both left and right hand pilot seats) won't slip, grab or chatter — even when wet! Wheel bearings are sealed against moisture . . . need only normal lubrication and maintenance checks. Note sturdy construction of entire landing gear assembly. Tires are standard U. S. sizes.

EASY OUTSIDE ACCESS TO ACCUMULATORS — Brake and main hydraulic system accumulators plus oil reservoir are charged externally, have direct reading gauges, are located in the wheel well. Make positive pre-flight checking easy!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"THE MOST SECURE INSURANCE CONTRACT EVER ISSUED"

Concerning settlement of a five year old damage suit and a personal injury counterclaim involving a rented plane and $89,300, Mr. Leighton Collins comments editorially in the December issue of Air Facts.

QUOTE—"The case points up the fact that in buying liability insurance, there is not only the question of adequate limits, but that such a policy is an extremely long term investment. The policy holder has to think of the financial strength of the insuror not as of to-day but a date many years from to-day.

We were impressed no end, recently in looking over one of our U. S. Aviation Insurance Group policies. Under that contract, all the casualty companies in the "U.S. Group", all blue-chip majors, are specifically listed in the policy and each company binds itself individually, directly to the policy holder for the full payment of any claim under the policy.

Backed as it thus is, directly and in full, by the five billion assets of the insuring companies, we believe this is the most secure insurance contract ever issued in the history of the insurance business." END QUOTE

Thank you Mr. Collins, for saying for us, what we could not in propriety say for ourselves.

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Committee 56 would review the matter and determine whether such a public service channel, having no connection whatsoever with the safety operation of aircraft, could be provided to take care of this rapidly growing need."

Frank C. White: *"Mr. Petry."*

C. A. Petry: "I certainly recognize Jean's need for this type of communication. It is not something that is peculiar to the business aircraft or the private aircraft, the airlines are just as interested in it as you are. In fact, we have been trying for years to get just such service, possibly tying it in with the general telephone service.

"Now you might jump to the conclusion that what the airlines want is a channel on which a passenger can make a telephone call. Well, that is secondary. There is a real airline business need to be able to communicate with the pilot for various administrative functions of the company. The pilot and other crew members of one airline feel that it would be an asset to their passenger service if the stewardesses or another crew member, while in flight, might coordinate some of the load control functions with appropriate personnel on the ground. This would clean up last minute and ever changing situations which are not uncommon in the handling of passenger accommodations. There are numerous needs.

"Jean said this requirement in his field was not necessarily a safety requirement. It has excellent safety connotations as far as the airlines are concerned since this would provide an alternate communication channel. We have talked about the undesirability of multi-channels, but at least in this thinking we are anticipating that this service would be provided by separate equipment and would be very helpful in case the regular channels should fail. Also, problems come up that don't lend themselves to discussion on a busy simplex channel where a lot of other people are involved. For example, there is need for some privacy when talking with a mechanical supervisor or others about conditions aboard the aircraft. There are requirements in connection with flight testing of aircraft which the flight crew could thereby coordinate with engineers on the ground.

"Now, the public communication carriers tell us they are interested in this, but they have to have frequencies to provide the service. I think that it may be very appropriate and certainly time saving for those of us involved in long range planning and frequency coordination to take a serious look at this problem. Perhaps we can find ways to meet this operational requirement, which is growing very rapidly, and in so doing provide service not only to the larger users, but also to the business aircraft and the private flier."

Frank C. White: *"Would the FCC be interested in providing a special service channel? Would FCC be willing to listen to a proposal of that kind if it came from RTCA for example?"*

William B. Hawthorne: "Obviously the Commission will consider any proposal made to it. The problem is not a new one; however, ARINC has indicated a certain type requirement whereas the AOPA and NBAA have indicated a different requirement. It would appear desirable that these requirements be coordinated and that an overall aviation requirement be formulated."

Frank C. White: *"Isn't it a question of public interest and what frequencies are available?"*

William B. Hawthorne: "On one hand there is a large stated requirement which we have just heard for additional air traffic control frequencies in the 118-132 megacycle band, whereas on the other hand there appears to be a different requirement for non-air traffic control communications to take place in the same band. In view of this it appears appropriate that RTCA be requested to review and make recommendations on this matter."

Frank C. White: *"It would appear from the discussion this afternoon that 1956 should see a considerable change in the aeronautical communications field. We have a general understanding of the need as expressed through the planning of the RTCA. We have an understanding of the need for channels as expressed by the users, and we have the equipment manufacturers doing their level best to provide the equipment. At the same time we are ready to go ahead with the use of 100 kc spaced channels, those between the ones we are presently using. Therefore, we should find a considerable alleviation of some of the problems that have been outlined.*

"Thank you all for showing up here today. It certainly has been a very fine and stimulating discussion."

Business Planes

(*Continued from page* 13)

the pilots. "He's tops," Mayfield says, and others—Sam Massey, Warren Ames, and Moe Mosher—all agree.

To the casual observer it may seem that an airplane flight is a simple thing and the business pilot's job an easy one. However, there are two hours of work involved, at least, before the take-off on any Hercules flight. Most of the preparation may be done the day before, but some work always has to be concluded in the early hours of the day the trip is scheduled.

"You might say that our work is finished and behind us only when we get in the plane for a take-off, because the flight is pure pleasure," Mayfield asserted.

Involved in the detailed preflight preparations are consultations with CAA publications, U. S. Weather Bureau stations, Airways Traffic Control, and sometimes the airport which will be the day's destination. There are flight routes to map out, an official CAA flight plan to file, and the airplane to check over with the help of Schaum.

Having reached their destination, plane and pilots must go through routine but elaborate steps to prepare for an immediate return flight, while waiting at the airport for passengers to complete their business.

At one such layover, Mayfield was paged on the airport's public address system. Upon reporting to the main office, he was introduced to a man who had missed the

industry notes . . .

■ The first *Fiberglas* Taylorcraft recently came off the company's assembly line. To be shipped to New Zealand, the aircraft will be used in agricultural work involving highly corrosive chemicals. Aluminum skin airplanes have been unable to stand up to this usage. Twenty of this Taylorcraft model have been ordered pending delivery of the first aircraft. Powerplant is a 225 hp Continental.

■ The *Decca Navigation System*, a radio-wave "grid" system that can provide a continuous, all-weather flight-position picture for helicopters and other aircraft, is being tested in southeastern Arizona by the U.S. Army. *Decca*, used widely in Western Europe, uses low-frequency radio signals in contrast to the high-frequency pattern used in conventional cross-country aircraft navigation. Radio waves are transmitted as a continuous chain from a main transmitter and its "slave" stations, spaced 70 to 100 miles apart. The radio waves form a precise grid pattern ranging from sea level to extreme altitudes. Pacific Division of Bendix Aviation Corp. points out that a commercial application of *Decca* would be for helicopters ferrying commercial airline passengers to and from airports in metropolitan centers. Test evaluation data will be made available to the commercial airline industry and to the helicopter service industry.

■ Two eight-place Beechcraft Super 18 twin-engine executive transports recently were flown across the Pacific to Tokyo for delivery to the Japanese Coast Guard. The flights were the second and third transpacific crossing for Beechcraft Super 18 type aircraft. The first Super 18 was delivered last year to Yomiuri Shimbun, Tokyo publishers.

■ Instituted as a result of recommendations by RTCA, the USAF's Air Research and Development Command will participate in a joint test program to accurately determine the magnitude of altimeter system errors in various models of military and civil aircraft. Altimeter system errors are believed to be the primary reason for the increasing number of near misses reported by pilots flying assigned altitudes with 1,000 foot separation.

■ The recent half million dollar purchase by Kindred Aviation Company, Burbank, California, of Aircraft Engine Supply Company, also of Burbank, makes the new combination one of the largest aircraft and engine parts dealers in the United States.

■ A CAA analysis of 1954 business flying shows that many businessmen pilot single-engine planes, but most of those who use multi-engine planes depend on hired professionals to fly them. Of 16,480 single-engine aircraft used primarily for business transportation, only 1,720 were flown by hired pilots. In contrast, 1,760 of the 2,080 multi-engine planes used mainly for business flying were piloted by hired "pros."

■ *Learstar* executive airplanes, in use by a dozen private owners, accumulated more than a million miles of operation in less than a year from the delivery of the first *Learstar*. The total is presently increasing at a rate of 200,000 miles per month, and it is estimated by Lear Aircraft Engineering Division, Santa Monica, that by the end of 1956 monthly utilization will exceed 500,000 miles.

■ A new series of AEROLOG performance computers has been developed by Link Aviation, Inc. Designated as Model 211 AEROLOG computer, it has been designed specifically to meet the requirements of aircraft industries interested in determining aircraft range and fuel consumption as well as computing steady-state rates of climb, maximum speeds, lift coefficients and climb angles. The 211 accepts standard wind tunnel data to solve performance equations and provide outputs of flight path angle, coefficient of lift, rate of climb, total drag or net thrust required, maximum velocity and true air speed.

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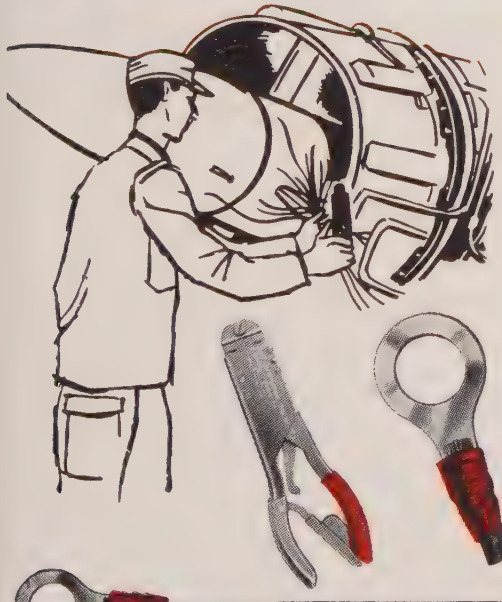

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Business Planes

(*Continued from page* 38)

regular airliner to New York and hoped he could charter the Hercules plane. Mayfield politely told the man he couldn't do that, but that upon the return of the Hercules group he might ask to accompany them as a guest to New York.

On his return to the plane the senior pilot related the incident to Sam Massey, his copilot for the day, who as a matter of course asked the man's name.

"He claims to be a Hollywood producer; says his name is Selznick," Mayfield replied.

"What!" shouted Massey, almost going through the cabin roof. "Don't you know who that is?"

"No, who?" Mayfield blithely asked. Massey told him. Both pilots sat back quietly and dreamed of potential visits to Hollywood, as guests of Mr. Selznick—who meanwhile had talked himself into a ride to New York with someone else.

Like thousands of other companies and corporations throughout the United States —both large and small—Hercules has found the airplane an indispensable "tool" to further their business interests and to reduce wear and tear on top executives and staff personnel.

Business flying is only now beginning to come into its own. Its possibilities are almost unlimited and its application is restricted only by the human imagination. Once considered a "luxury" item primarily for the use of principal corporate executives, the airplane now has become an essential part of the commercial operations of over 6000 business and industrial firms in the United States. In 1955, the some 25,000 aircraft presently engaged in a variety of business flying activities accounted for approximately 4,300,000 hours of flying, far exceeding the combined total of the domestic airlines.

Each day new uses are being found for business aircraft, and each day scores of leading business firms—like Hercules Powder Company—are adding their well-known names to the ever-growing roster of satisfied participants in America's most modern form of private air transportation—business flying.

Air Lift

(*Continued from page* 12)

express, and has carried over 30,802 passengers—an impressive record for an organization so young in years.

Passenger fare for helicopter travel is relatively low, averaging around *40 cents* a seat mile. Actually, this charge does not offset the cost of operation. The difference is made up in the form of public service pay from the government in recognition of the fact that New York Airways carries United States mail, is helping to develop the field of helicopter transportation in the public interest, and is a part of New York City's emergency civil defense organization. The helicopters' vital rescuing role was stirringly demonstrated early last fall during the flood devastation of the New England countryside.

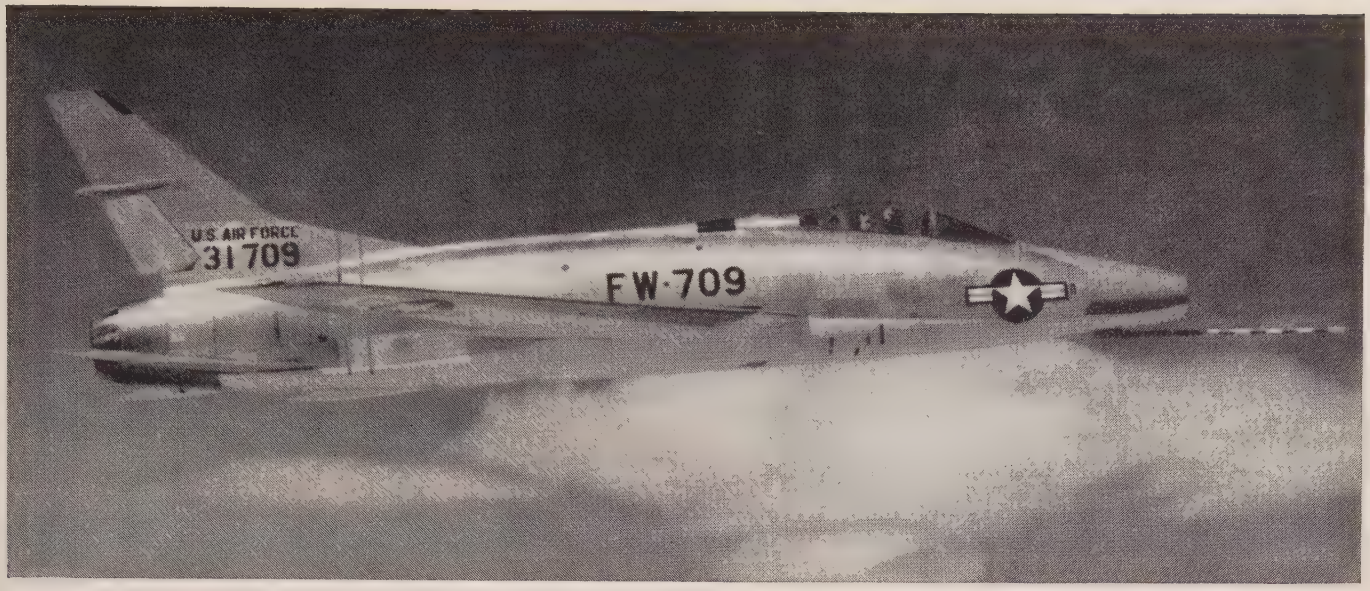
One of the principal objectives of New York Airways was attained in February 1955 when a joint fare agreement was made with Northwest Orient Airlines providing single-fare transportation between New York airports by helicopter as part of the overall airline trip. Similar arrangements have recently been made with Pan American World Airways, Trans World Airlines, KLM, Sabena, SAS, and Swissair. All fares went into effect on November 1, 1955.

The joint fare arrangement is a boon not only to New York Airways for the increased passenger travel, but also to the passengers, because of its package and convenience aspects. Helicopter tickets may be purchased at any major airline ticket office, and passengers are always contacted prior to flight time. Transportation to and from the fixed-wing airlines is provided by station wagon as an added service of the joint fare arrangement.

With regard to weather restrictions, New York Airways' craft do not fly during the day if the ceiling is less than 500 feet and the visibility less than one-half mile forward. For nighttime flying the restrictions are increased, and no flights are made if the ceiling is less than 1000 feet and the visibility less than three miles. Due to the single-engine aspect of the helicopter, there is no flying in clouds on instruments at the present time under zero visibility conditions. Intensive tests are being conducted, however, and it is expected that instrument flying will come about in the not too distant future along with the development of the twin-engine.

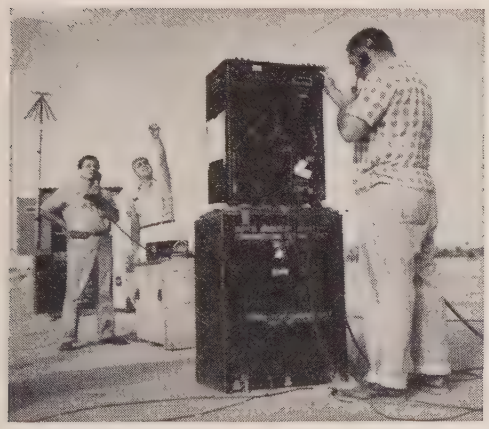
Preventive maintenance is conducted around the clock by a crew of 33 skilled mechanics. It is estimated that there are approximately six hours of line maintenance time for each flight hour of the 600 averaged per month.

One of New York Airways' major problems at present is the need for a centrally-located Manhattan heliport. Many of Europe's key cities are enjoying the advantages of heliports, but New York, the greatest city in the world, has not gotten around to building one. The need for such a heliport has been strongly cited and officially recognized. An approximate location has even been agreed upon—the Hudson River and West 30th Street. The issue that has succeeded in bottlenecking construction for close to two years is the type and cost of the proposed heliport. The Port of New York Authority, the contractually chosen agency to build the heliport, has strongly recommended a bulkhead site in this area. New York Airways is all in favor of this, and the plan has enlisted the approval of every known helicopter expert in the country. But the City's Department of Marine and Aviation has voiced dissent to the plan, and instead, has proposed to build the heliport on the roof of a freight terminal. The roof-top installation would cost about $600,000, take a year or more to build, and most likely prove unsatisfactory in the end. On the other hand, the bulkhead site would cost only $50,000, be ready for use within a month, and is supported by solid endorsements from the recognized experts in the field. Whatever the final outcome, it is to be hoped that a

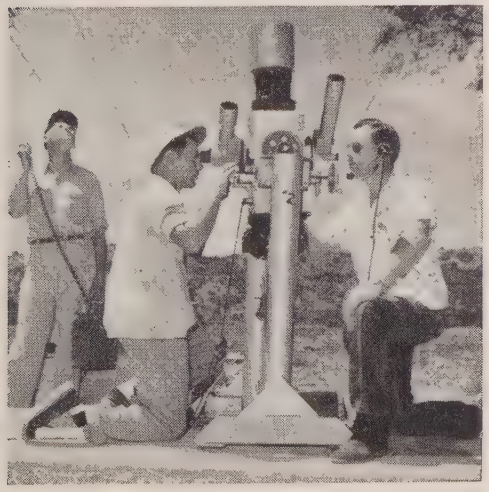


Champion-equipped F-100C Super Sabre sets supersonic speed record...822 mph!

Air Force Officer pilots North American jet to new world speed mark



This electronic timer, used to clock the record run, measures time down to a fantastic 1/100,000th of a second.



High-altitude scanner with telescopic viewfinder, specially designed to check on aircraft speed trials.

Flashing through the sky eight miles above California's Mojave Desert, an Air Force North American F-100C Super Sabre streaked to a new official world's speed record . . . a supersonic 822.135 miles per hour. The pilot twice guided the speeding ship over the 11-mile course . . . once at 773.644 mph, and once at an astounding 870.627 mph, for an average speed of 822.135 mph . . . bettering the previous record by more than 70 miles per hour!

The speedy Super Sabres are powered by Pratt & Whitney J-57 turbojet engines delivering over 10,000 pounds thrust. Champion Jet Igniters are original equipment on these engines, as on most leading jets. Champion dependability is important in jet engines, for in case of a "flame-out" the jet igniters must refire the fuel—quickly! Because Champion has an outstanding record for producing a dependable, quality product, leading manufacturers choose Champion to fire the flame that sends their jets flashing through the sky.

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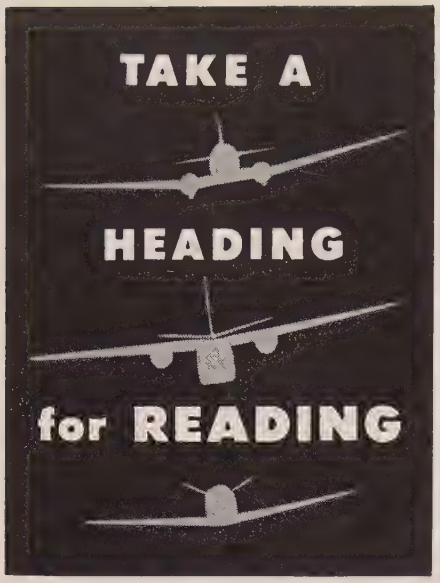

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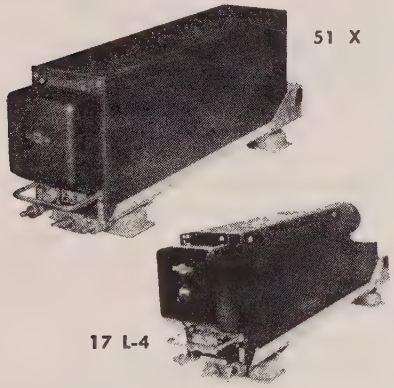

Both units are ½ ATR size, assuring ease of installation and no weight penalty.

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decision will be reached shortly so that this long-needed service can at last be provided.

In the meantime, the helicopter industry is undergoing a phenomenal growth. Within a few crowded years, mechanical advances and developments have given the helicopter a prominent place in the nation's air economy. Certainly, the present expenditure of time and effort in the development of the mechanical and technical phases of operation makes it not unreasonable to expect still further major advances within the next few years. If these are combined with the development of appropriate instruments and communication equipment for all-weather operations, the result will be more reliable, more economic operation.

From all indications, the growth chart of the helicopter industry will duplicate the vertical ascent of its aircraft.

Whirly-Bird

(*Continued from page* 11)

the regulations by taking all possible advantage of the special characteristics of the 'copters. This must be done, however, without any penalty to fixed-wing traffic.

Although the helicopter has demonstrated that it can be flown with very close tolerance as to track and altitude, current radar standards of three mile separation or 1000 ft. cannot be reduced to the sought-after one-half mile or 500 ft. unless the regulations are changed. And these probably will not be changed unless the operators of fixed-wing aircraft are able to overcome their distaste for unseen traffic operating this close.

Helicopter traffic operating in restricted visibility northeast and southwest along the Bronx shoreline necessarily conflicts with LaGuardia instrument approach traffic coming over New Rochelle and the low frequency range station at 1000 and 800 feet respectively. Terrain conditions compel this route and altitudes for 'copters because of the economic necessity to operate with wheels rather than the heavier floats which would allow almost traffic-free operation.

Another "fly in the ointment" is the impracticality of on/top operation in smoke instrument conditions. Fixed-wing aircraft can depart with virtually VFR separation and a minimum of control when a low top exists. 'Copters must reduce their effective maximum operating altitude as the forward visibility decreases in order to maintain ground contact. For instance, in visibilities less than two miles, it is hard to maintain effective navigational ground contact above 1500 ft. And for most helicopter route structure operations, current available navigational aids are neither accurate enough nor so placed as to justify the equipment weight aboard the aircraft. Virtually all enroute and local control navigation is necessarily by ground contact.

The present necessity for 100% control in low visibility operations has compelled a modified version of the well-known problem of frequency multiplication. To insure maintaining even today's standards of separation, it has been found imperative at LaGuardia that the 'copters establish radio contact with Radar Departure Control on approach to and departure from the airport pattern in low visibility. New York Airways has adapted available equipment so that the pilot may select the appropriate frequency without getting his head "down and locked" in the cockpit, which can be a more critical situation than it is for fixed-wing pilots.

Another communication problem arises as a result of traffic control necessity when a 'copter wishes to depart from the New Rochelle or Mt. Vernon landing pad. The pad is situated neatly below the approximate point where inbound fixed-wing aircraft on instruments start their descent below 1000 ft. after leaving the holding pattern. The 'copter must obtain ATC clearance before exceeding 100 ft. altitude on climb to his required minimum altitude of 500 ft. enroute LaGuardia. VHF communications from New Rochelle to LaGuardia at 100 ft. altitude would make fixed-wing pilots turn over in bed.

Ramp congestion at LaGuardia is so much more a factor than at Idlewild or Newark that only the complete co-operation of both classes of pilots as well as controllers has kept the operation there less of a hassle than it obviously could be. In general, 'copter pilots are as reluctant to make landing approaches over conventional aircraft as the conventional aircraft crews are to be "sitting ducks" for any landing 'copter. Both have been outstandingly patient and considerate. Fixed-wing pilots have accepted short delays to allow a 'copter to use the taxy apron for final approach let-down. 'Copters have executed short 360° turns on base leg to allow a taxying aircraft, already cleared, to pass the pad. Despite general public misconception, "hovering" is not a routine helicopter maneuver in commercial operations, since it relies completely on a high power setting.

When the long-awaited multi-engine helicopter "bus" type take to the airways in significant number, the slow infusion of more-automatic control, co-pilots, full instrument operation at altitudes and speeds approaching the fixed-wing category (at least with respect to minimum safe-control airspeeds in hi-density terminal areas) may eliminate some of the foregoing problems, but only to introduce new ones merely hinted at now. And again, as with conventional aircraft, the non-business 'copter may soon outnumber the franchised types. Any proposed revision of regulations or assignment of corridor flight paths will have to take them into consideration.

Acknowledgements

Grateful acknowledgement is hereby made to the following for their assistance in the preparation of this article.

Captain Howard Higgins, Chief Pilot
New York Airways

Mr. William A. Parenteau, Chief Controller
LaGuardia Field Control Tower

Air Traffic Control Branch,
Airways Operations Division,
Civil Aeronautics Administration,
N. Y. International Airport, New York.

Port of New York Authority,
LaGuardia Field, N. Y.

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THE SQUAWK SHEET

Quotation from Flight Safety, Inc. Newsletter:—

"Collins Radio advises that a number of instances of sluggish VOR operation as shown on RMI needles, have been experienced in a number of 51R-2 and 51R-3 installations. The trouble has been traced to the fact that transformers used in the automatic portion of the VOR receivers have been supplied by a number of different manufacturers and that *the variation in manufacturing techniques* has caused this condition to exist.

"Should this condition exist in your aircraft, it might be wise to have the system checked to determine whether the Omni-Bearing Indicator (usually mounted in the VOR accessory unit in the radio rack) is at fault, and if so, have Collins 51R-2 and 51R-3 Bulletin No. 53 (12/5/55) performed. This bulletin describes a modification which would adapt the receiver to transformer variations."

'Armor Coating' Saves Propellers

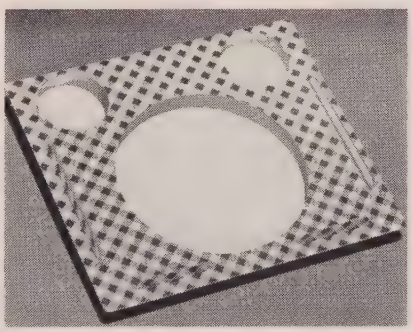
Armor coating aircraft propeller blades with a thin layer of nickel has proved an effective method of protection against damage from stones, debris or water spray, according to Erle Martin, general manager of Hamilton Standard. The coating process superimposes several thousandths of an inch of nickel on either solid aluminum or hollow steel blades. In three years and more than two and one-half million hours of commercial and military service-testing and operational experience, it has virtually eliminated abrasion and erosion damage to the propeller blades wearing the *armor coating*.

Two airlines tested the coating on the *reversing* Hydromatic propellers of their Martin 404's. One, equipped with coated blades on one engine only, inadvertently taxied recently into an area where loose trap rock covered the runway. In the resulting fusilade of stone sucked up into both props, the uncoated blades sustained extensive damage and the armored blades were virtually unscratched. (At Pester's Propeller Shop on Long Island, N. Y., the writer saw a similar comparison between blades from a Coast Guard amphibian exposed to salt water spray.)

It provides outstanding protection to aluminum blades from the eroding effect of salt water spray. Adapted with changes in the bonding agent, the nickel-coating process substantially reduced damage by stones and other debris to hollow steel blades used on rough forward airstrips in Korea.

The process was developed jointly by Hamilton Standard and Bart Laboratories of Belleville, N. J. It includes the use of a synthetic rubber compound developed by Ham-Standard to establish a bond between the two metals. Coating of hollow steel blades is based on a bond created by successive layers of zinc and copper.

As of right now, the cost of the process is three to four times that of war surplus blades for DC-3's, Lockheeds, etc. (currently available, but in the future?). Operators of Mallard and Goose aircraft face a replacement problem now.



Catering Adds to Operator Income

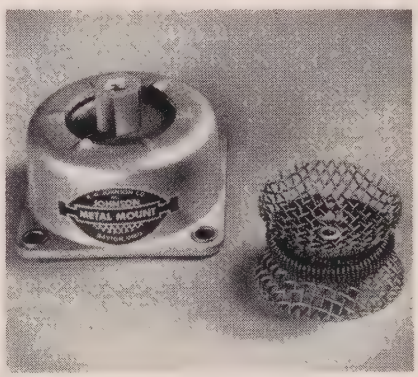
Taking a leaf from such money-wise operations as the large terminal airports and bus stations, operators of small off-trunk line airports which are common ports of call for executive and business aircraft, are turning to many side-lines to add the very welcome income that can turn the ledger entries from red to black while the aviation activity is being expanded and improved.

In many instances, business aircraft pilots are unable to spot or time their stops at airports with adequate restaurant facilities. The operator who can offer a satisfactory catering service, even on a no-profit basis, offers a strong inducement to bring customers in for the primary aviation services he wishes to sell.

A line of rigid, "three-dimensional" attractively decorated paperboard trays that will hold a complete meal without spills is now being manufactured by Cramer Products, 99 Hudson Street, New York City. Samples will be sent on request. Available in a variety of colors and many patterns, the trays wipe clean with a damp cloth.

Even an inexperienced person can set them up in a jiffy and the interlocking feature assures stability. "Carry-Grip" handles are an integral part of their construction. A standard tray 11⅜ x 10 inches holds an 8 inch plate and two cups. The 15½ x 13 inch size has nine holes for plates, cups, creamer, and salt and pepper as well. They can be used with paper, china or plastic plates, cups or dishes—wherever an attractive, sturdy tray is needed for carry-out or lap service. A patent has been applied for.

Shipped flat in cases of 250, or in smaller units, trays take minimum storage space.



New Metal Vibration Mounts

The need for an isolating means of mounting delicate electronic and navigational instruments in aircraft, stems from the fact that most electronic components are developed primarily for non-dynamic applications such as radios and television.

To provide maximum vibration protection and equipment stability in aircraft and missiles, the K. W. Johnson & Co., Inc., of Dayton, Ohio, is producing Johnson Metal Mounts. The double damping system uses a circular coil spring which tempers the motion of a convex-concave spring and lifts the efficiency of the damping to 95 per cent—the highest ever attained. It is possible to read critical instruments even during minor shock conditions, a feat heretofore impossible with other types of mounts.

The unique convexed springs fabricated of *BERYLCO* brand beryllium copper wire cloth form the heart of the arresting system and absorb most of the vibration and shock. Two of these discs are fastened together back-to-back fashion. The convex surfaces face each other. A brass eyelet in

(*Continued on page* 45)

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Physical: Must be able to pass standard company flight physical examination for Flight Engineers.

Experience: A. Must have four years diversified aircraft and engine mechanic experience. One year of this experience must be on aircraft with engine rating of at least 800 H.P. In addition, must be able to secure the A&E licenses.

Preference is given to the following additional experience:
1. Holders of current A&E licenses.
2. Have 100 or more certified panel hours as Flight Engineer.
3. Have CAA Commercial Pilot's License with 200 or more certified hours.

For current and future openings, write immediately detailing personal qualifications, work experience and flight time to:

A. M. BEVERLY, *Chief Flight Engineer*
Eastern Air Lines
Box 787 Miami 48, Florida

NBAA

(*Continued from page* 25)

times the gross weight of the airplane.), (4) The strength of the vortices (and severity of the gust loads) increases as the span loading increases, and as the airspeed *decreases.* The most violent vortices are found behind an airplane with high span loading flown at a slow airspeed (as on landing approaches), (5) Increasing the angle of attack (by evasive maneuvering) without first reducing the airspeed will increase the gust load imposed on an airplane when crossing through trailing vortices, and (6) The highest and most destructive "G" loads imposed by flying across trailing vortices are downward.

Jet Engine Blast has been found to cause dangerous turbulence within 200 to 300 feet aft of the tailpipe in flight. Since flight by small aircraft in this area is unlikely, the effect of jet blast is not considered a major hazard in flight. The area aft of jet aircraft should be avoided on the ground, however.

Sonic Booms have been the subject of much serious investigation. The sonic boom is a shock wave, or combination of such waves, propagated by an airplane at or above the speed of sound. Characteristically, two major waves of this type accompany an airplane flying at or above mach 1 (speed of sound—about 760 mph) in level flight, one at an angle of about 45 degrees back of the nose in all directions, and one in a sharp vee just aft of the tail. When an airplane which has produced such shock waves slows to below mach 1, the shock waves which have accompanied it proceed along its direction of flight, and combine at some distance ahead of it before disintegrating. It is this combination of shock waves which produces the much publicized sonic boom on the ground after a high speed dive.

Investigation has proven that the sonic boom produces for a very short duration an impact of about 30 lbs per square foot at a distance of 400 feet below the flight path of the airplane which caused it. It is anticipated that higher fighter speeds may bring this to 50 lbs per square foot in the near future. The sonic boom has been observed to break plate glass doors and their frames, and is undoubtedly capable of much structural damage.

The radius of probable structural damage from the sonic boom generated by an airplane in level flight at the speed of sound or over is estimated to be about 750 ft. Numerous tests of its effect on a fighter airplane in flight have failed to produce structural damage, although serious impacts were registered. It is believed that an impact of this magnitude caused by the passage of a fighter within a few hundred feet, above the speed of sound, can cause structural disintegration in a small airplane.

Collision is a hazard which may exist when any two aircraft are flown in the same general area. This potential hazard increases greatly when one or both are flown at extremely high speeds. A pilot in a high performance business-type airplane who observes a jet one and a half miles distant on a 90° converging course has about seven *seconds* to take evasive action to avoid a collision. (These data are condensed from CAA Aviation Safety Release No. 399.)

In summation, the obvious threat of potential collision is properly re-emphasized. Greater publicity is now indicated for the area of destructive turbulence behind and below the flight path of other aircraft.

DC-3 Accident Stresses Effective Crew Coordination

The CAB accident report of the NWA DC-3 that collided with a powerline pole during an attempted go-around at Yakima Airport, Washington, again stresses the importance of effective crew coordination.

Omitting the full details of the investigation, the following points were extracted from the report.

(1) The captain stated that he touched down on the wet runway at an IAS of 70 knots, approximately 1,000 feet from the approach end, (2) Although hydraulic pressure was normal and the brake pedal pressure satisfactory, no braking effect was evident, (3) The captain after notifying the co-pilot of lack of braking, initiated a go-around by applying take-off power and became airborne at 70 knots, (4) At 78 knots and 25 feet over the end of the runway, the captain called for "Gear-up," whereupon the co-pilot closed both throttles, and (5) The co-pilot contended that he had not been advised of the balked landing. He accounted for his action in closing the throttles by stating: "At the time the command was given I was expecting an order to reduce power inasmuch as it looked like a crash was inevitable—when the order came, I moved them by spontaneous action."

What would you have done under similar circumstances?

IFR Weather Approaches Safeguarded by Controllers

All instrument approaches on the ILS or other letdown facilities, according to current procedure, which are made within the coverage areas of Precision Approach Radar equipment, are observed (monitored) by CAA controllers whenever the weather is below the basic VFR minimums (1000-3). Although these approaches are being "monitored" (observed on radar), *advisories* are only transmitted to the pilot: (a) When the pilot requests the service, and (b) When a situation or an emergency is observed which, in the opinion of the controller, could affect the safety of the flight.

The controller will continue to transmit advisory information until such time as the pilot reports contact or that he has the runway in sight.

Recognizing that such advisory information might prove disconcerting or distracting to a pilot who is already contact, and that the information might not be entirely necessary, the CAA has requested that pilots be advised that the controller will cease transmission of advisory information only upon receipt of a report that the pilot is contact or that he has the runway in sight.

Some airlines have arrangements whereby *advisories* are transmitted to all their flights when weather falls *below the highest circling* minimums.

NU-AVI-QUIP

(*Continued from page* 43)

the center binds them together, and a circular coil spring made of stainless steel is fitted around the assembly in the "V" made by the joining of the two beryllium copper discs.

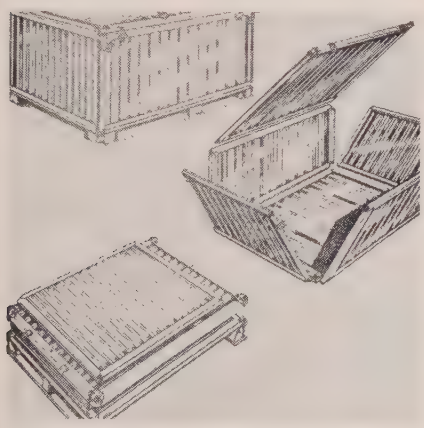
The concave-convex beryllium copper assembly forms the main spring action which absorbs the shock in a vertical and radial pattern. As shock is encountered, the motion of the beryllium copper spring is resisted by the friction of the coil spring against the convex surface of both facing surfaces.

The end result is a double damping system where the coil spring tempers the concave-convex system and, at the same time, is damped by it.

In addition to stringent load requirements, the metals used were tested to withstand temperature differentials ranging from —65° centigrade up to +200° centigrade, high salt spray concentrations, extreme humidity and long storage life. After a long storage period, rubber type mounts lose their resiliency and become "dead." This can never happen to the beryllium copper springs. The finished mounts weigh three and one-half ounces as compared to other available units using other materials which weight four to four and one-half ounces.

Collapsible Box Pallet Developed

The Air Force is testing a new type of aluminum box pallet designed especially for airlift of cargo that should interest all operators. To be used to handle and move supplies with forklifts and other mechanical equipment, the reusable box pallet, known as MN-1, will be introduced on a test basis about June 1. It was developed through industry-Air Force teamwork.



It is collapsible, stacks, is easily tied down in an aircraft, and is strong enough to provide adequate protection for supply items. Therefore, only minimum protective pack is needed.

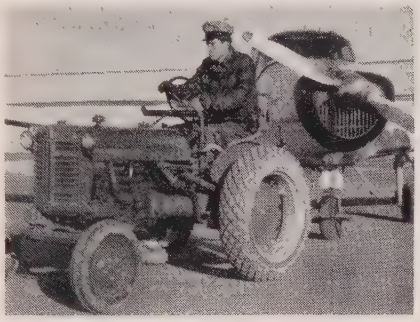
Forty inches wide, 48 inches long, and 32 inches deep, it has a capacity of 425 lbs and a tare weight of 68 lbs, which compares well with equal capacity wood cases.

Normally, the elimination of individual shipping containers from the many items carried in the MN-1 box pallet, reduces cubic displacement by 50 per cent, and net weight by 20 per cent.

Lo-Boy Tractor for Airport Use

Both private and public airports will be interested in the International Cub Lo-Boy as a handy utility tractor-mover with many uses. The Lo-Boy delivers 9.4 hp at the drawbar, is 55 inches high, 48 inches wide, has individual wheel brakes, and can pivot in a 96 inch radius.

For airport and runway care, a three-gang lawn mower covering 57½ inches mounted in front becomes a useful tool. The mower can be replaced by a 54 inch blade for leveling, grading or snow removal. The tractor may be equipped with Fast-Hitch which enables the operator to hook onto a full assortment of implements



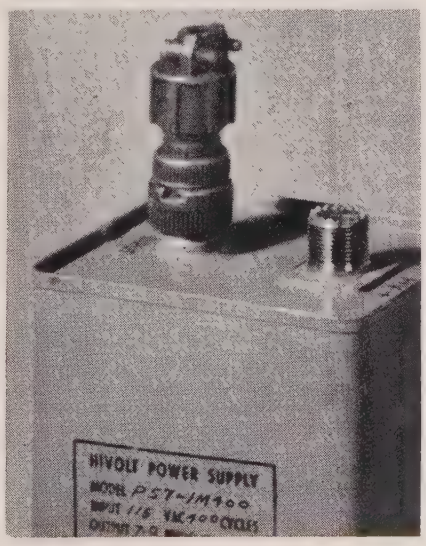
quickly and without leaving the seat. Equipment is hydraulically controlled.

New Plug Eliminates Multi-Leads

A new hermetically sealed connector type input plug for power supplies, designed to cut down the number of leads to the supply, is offered by Condenser Products Co. of New Haven, Conn.

The new polarized connectors result in completely cabled power supplies with only two screw type connections—one for high and one for low voltages. Thus, they eliminate the need for bringing a lead to each of a number of single bushing terminals. The connectors have either two, three or four pin contacts. They are available on all Condenser Products Company power supplies.

While primary use is as an input terminal, the connections also can be used for control circuits and interlocks. The mating connectors are AN 3106 type.



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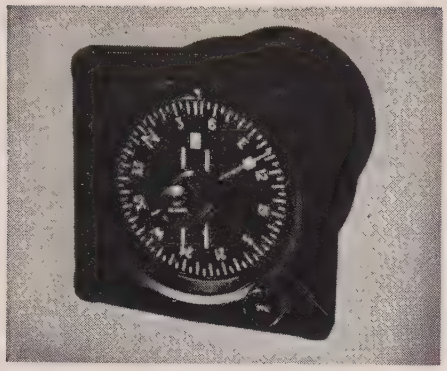

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Fuel Gauge Tank Unit Tester

A portable field and shop tester for fleet operators or aviation service shops that provides all necessary instrumentation for checking calibration accuracy and electrical insulation qualities of fuel gauge tank units has been announced by AVIEN, Inc., Woodside, N.Y.

Model 1617-040 meets military requirements and may be used for all capacitance type tank units regardless of manufacturer or aircraft applications. It requires neither external bridges nor reference condensers and measures tank unit capacitance directly, without use of correction cards or interpolations. Three ranges of measurement, 0-100 uuf, 0-1000 uuf and 0-5000 uuf, permit checking single tank units or complete fuel gauge systems with equal accuracy. Use of silvered-mica standard capacitators maintains calibration through all environmental extremes encountered in field service.

Included in the tester are provisions for measuring insulation resistance of tank units either through fuel gauge cables or by means of external test leads. Range of resistance measurement is 0-10,000 megohms. In any test function or range, maximum voltage applied across the equipment being tested is limited to 50 volts DC, thus assuring safety of equipment and operating personnel.

The tester comes with a 10 ft power cable, two 8 ft connector cables, two test leads and six adapter cables that will accommodate tank units of all makes. Cables are housed in a stowage compartment when not in use.

Accuracy of the capacitance indicator is ±0.5% of full scale. Power requirements are 115V, 400 cps, about 25 watts, and can be taken from the standard aircraft supply. Weight 18 lbs.

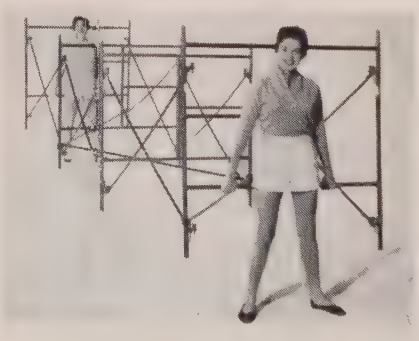
Advances In Airborne Hygiene

Although not a new product, having been on the market over a year, WASH-'N-DRI the "miracle moist towelette" deserves review again because of its remarkable facility for comfort in limited quarters. Especially useful for executive aircraft operators, these little 2" x 2" aluminum foil envelopes contain a wet-strength paper towelette measuring 8½" x 6", moistened with a very slightly fragrant cleansing lotion agreeable to both sexes.

Easily disposable, the towelette cleans and refreshens face and hands without water, soap or towel.

New Light Weight Maintenance Scaffolding

The two girls shown, neither admitting to over 100 lbs wet, are carrying 21 feet of scaffolding capable of supporting a 4200 lb load. Made by Waco Mfg Co., of Minneapolis, Minn., it is rated at 50 lbs per square foot.



The framing sections, 4′ by 4′, feature the Speedlock method of attaching braces and built-in ladders. Braces are the tubular, pivoted type and a section of scaffold 4′ x 4′ x 7′ long consists of only four parts, all made of high carbon steel tubing. A complete line of accessories and casters to form rolling towers is offered.

Further specifications on the above (scaffolding, not the girls) can be obtained from the company at 3555 Wooddale Avenue, Minneapolis 26, Minn.

Washington report . . .

Joint CAA-USAF ATC Study

A study of the complex problems associated with the use of United States Air Force Continental Air Defense Command radar information for civil air traffic control purposes will be conducted by the Civil Aeronautics Administration and the United States Air Force.

The evaluation is an Air Navigation Development Board project and will be conducted by the CAA Technical Development and Evaluation Center at Indianapolis in cooperation with the Continental Air Defense Command at the latter's radar installation at Rockville, Indiana.

The evaluation will be to investigate the various methods whereby CAA can employ ADC radar information for civil air traffic control without compromising the primary mission of the Continental Air Defense Command. The evaluation will be conducted in two phases.

First, the radar performance will be tested, using various adjustments to obtain the maximum performance of the equipment to meet differing functions of air defense and air traffic control, and to determine, if possible, a common arrangement that will meet the requirements of both functions simultaneously.

The second phase of the study will be conducted from the CAA Air Route Traffic Control Center at Indianapolis, using an already contracted-for microwave link between Rockville and Indianapolis, a distance of some 50 miles. This will be the first use of a microwave link for remoting radar information between distant points for air traffic control. The second phase of the study is scheduled to extend over a two-year period.

The CAA and the Air Force have started initial evaluation flight checks of the Rockville radar to determine radar coverage and communications required for air traffic control. Flight checking is to be done at both high and low altitudes. The evaluation has moved into the operational phase with controllers from the Indianapolis Air Route Traffic Control Center controlling a portion of the area under the Center's jurisdiction from quarters provided by the Air Force adjacent to the ADC radar room at Rockville. Controllers will be in direct contact with the ARTCC proper by interphone.

The operation will move to the Indianapolis ARTCC in June and the radar data will be remoted there via the newly installed microwave link.

Special Safety Committee Formed

The National Safety Council has formed a new Special Committee on Air Transportation Safety with Col. W. L. Tubbs, assistant for Ground Safety, USAF, as chairman, and A. H. Vey, director of NSC's Traffic and Transportation Department, as secretary. The commitee is to review NSC's present aviation safety award program. NBAA president, Henry W. Boggess, will serve on the committee.

Now Hear This

(*Continued from page 8*)

Robert E. Coleman has been appointed West Coast sales engineer for the Weatherhead Co.

John S. Hammond, former director of customer service, has been named secretary and a member of the board of General Aircraft Supply Corp.

Dr. Wolfgang Harries has joined the staff of the research and development division of Air Associates.

C. A. Degucz has been appointed director of aircraft battery sales for Reading Batteries Inc.

Howard K. Morgan recently was named director of commercial aviation systems for Bendix Aviation Corp.

H. W. Cleveland has been appointed manufacturing control manager of the Tulsa division of Douglas Aircraft. **H. V. Montgomery** has been named to Cleveland's former position, planning general supervisor for the Tulsa division.

Charles B. Huizenga recently was named to the new position of assistant secretary of Kawneer Co.

Karl F. Kellerman was named associate director, **Charles A. Piper,** director of industrial systems; and **James W. McNabb, Louis B. Young** and **R. E. Geller,** staff engineers of Bendix Aviation Corp.'s systems planning group. **Dr. Robert F. Reinhart** of Case Institute of Technology was appointed consultant to the group.

Harold T. LeMay has been appointed director of employee relations for Pratt & Whitney.

H. W. Caward recently moved to the post of director of flight operations for Western Air Lines. **Stanley J. Cavill** was named to Caward's former position, system chief pilot.

Richard H. Horning, sales manager for Kawneer Co.'s Aircraft Products Division has been named assistant general manager.

Leonard S. Hermelin recently was appointed executive assistant to the vice president of Fairchild Camera and Instrument Corp. and general manager of the reconnaissance systems division.

Marvin L. Taylor has been appointed recruitment and training coordinator for engineering and technical personnel of General Dynamics Corp. **Roy R. Brewton** recently was named controller of the Convair Division of General Dynamics Corporation.

Dr. Louis Ten Eyck Thompson has been elected vice-president for research of Norden-Ketay Corp. it was announced recently.

Martin E. Collis, Jr., has joined TEMCO Aircraft Corp. as group engineer for test and evaluation.

Willard D. Jamieson has been named chief accountant and manager of Lockheed Aircraft Service, Inc.

HONORS

Harry F. Guggenheim has been elected an Elder Statesman of Aviation by the NAA. He is the first man elected since the first 15 senior Americans were elected when the new honor was created last year.

Morris F. Ketay, president of Norden-Ketay Corp., received the annually awarded Gano Dunn Medal for outstanding professional achievement from the Cooper Union Alumni Association.

Ray C. Shrader, vice president and director of Braniff International Airways, recently received the airline's first 25-year service award. He was the first pilot hired by the airline.

Ogden R. Reid, president and editor of the New York *Herald Tribune*, received the 16th annual Frank M. Hawks Memorial Award from American Legion Air Service Post 501.

AERO CALENDAR

Apr. 9-12—Society of Automotive Engineers, national aeronautic meeting, aircraft engineering display and aeronautic production forum, Hotel Statler, New York.

Apr. 16-18—Annual meeting, Aero Medical Assn., Drake Hotel, Chicago, Ill.

Apr. 22-26—Twenty-ninth annual convention, American Assn. of Airport Executives, Hotel Carter, Cleveland, Ohio.

Apr. 26—Annual regional meeting, Institute of Navigation, Friendship International Airport, Baltimore, Md.

May 2-3—Air Traffic Conference, Air Transport Assn., Hotel Radisson, Minneapolis, Minn.

May 2-5—American Helicopter Society, 12th annual national forum, Sheraton-Park Hotel, Wash., D.C.

June 21-22—Twenty-seventh meeting, Aviation Distributors and Manufacturers Assn., Grove Park Inn, Asheville, N.C.

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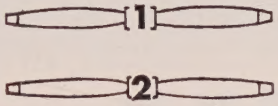
have been precision-built for Personal and Business Aircraft



There are 2 good reasons why McCauley has been able to manufacture and sell more than 50,000 Met-L-Prop and Met-L-Matic forged aluminum propellers in the past 10 years.

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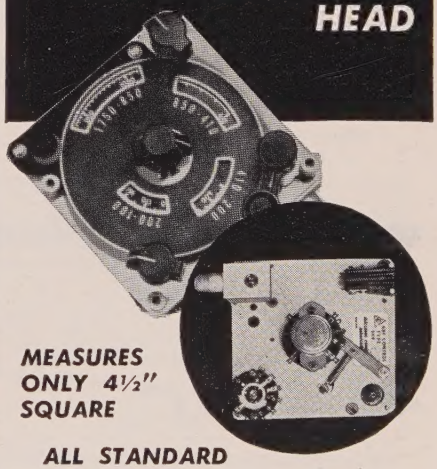

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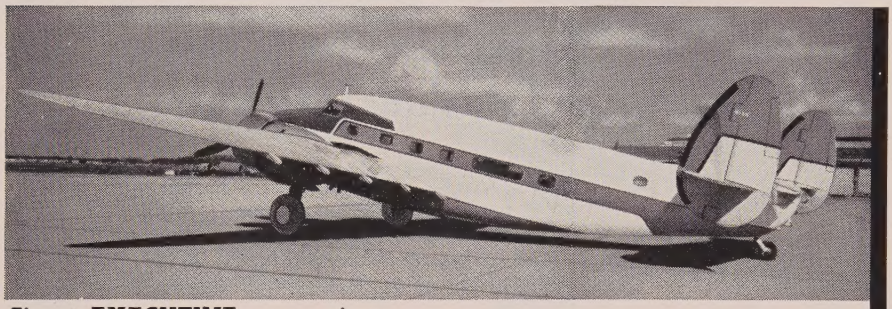

Finest **EXECUTIVE** conversion

LOCKHEED LODESTAR FOR SALE

If you are looking for a clean, up-to-date LODESTAR just relicensed — this modern executive conversion will surpass even your most exacting specifications.

BRAND NEW PAINT: Dove-grey wings, royal blue with gold striping trim on fuselage.

BRAND NEW INTERIOR: Beige gabardine headlining, charcoal/turquoise forward divan (seats 3) and on the six comfortable seats. Plenty of storage space, bar, buffet, cabin radio, plush lavatory and TWO PANORAMIC WINDOWS. High-lustre pickled walnut finish throughout on light-weight woodwork.

ZERO TIME, since overhaul, 1350 horsepower Wright R 1820-56 engines with latest WAC factory valve seat modifications. Hamilton Standard Hydromatic props.

SPECIALS: 110-115 volt AC converter installed with convenient cabin outlets for dictaphone, recorders, razors, etc. Scott Hi-pressure oxygen system, cabin instrument panel and many more extras to make this executive Lodestar the cream of the crop.

225 MPH CRUISING SPEED

644 gallon wing tanks—freshly checked and repaired; dual fuel system; fuel flow meters; one T21 ARC 10-channel transmitter; 2 ARC Type 15 omni receivers; one ARC-3 24-channel VHF transceiver; one Bendix ADF; one ILS glide-slope receiver; one Bendix MN55 marker receiver; isolation amplifier; complete windshield; carburetor and prop alcohol systems; high pressure Goodyear brakes. Take-off weight 19,500 lbs.

1170 MILE CRUISING RANGE

For detailed information on this outstanding executive LODESTAR; write, wire or call:

HERROL BELLOMY
Executive Vice President
Phone NEwton 4-0611

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SKY DIVING

The air over Moscow, Russia, will be filled with parachutes from July 15 to 30, 1956, during the third world parachuting championship sponsored by the Federation Aeronautique Internationale. Fourteen countries, twice as many as in 1954, are expected to participate in this new and exacting sport. For the first time, the United States will field an official team.

The National Parachute Jumpers-Riggers, Inc., an affiliate of the National Aeronautic Association, is the sole agent of the FAI in the United States and thereby controls all civilian parachuting events as well as the training and designation of the official United States team. First Lieutenant Jacques Andre Istel, United States Marine Corps Reserve, is in charge of the training of the team.

Funds for sending the team to Russia are being raised through an appeal to the aviation industry and the public at large. The funds are being collected by the National Aeronautic Association and all donations are tax deductible.

The training of the United States team will start around April 15 near Trenton, New Jersey.

Support American Sky Diving. Contributions should be sent to the National Aeronautic Association — Parachute Fund, 1025 Connecticut Ave., N.W., Washington 6, D.C.

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Dealer inquiries invited

Write for availability of the latest radio and navigation equipment. Large stock maintained of airborne electronics, both NEW & USED.

COLLINS— 17L-4, 51X, FD-103, IFS, 51R-3 Omni & all accessories, 51V-2, Glide Slope, etc.

SPERRY— C2 & C4 Gyrosyn, H5 & H6 Horizon, Engine Analyzer & A-12 Autopilot.

ARC— Course Director, 15D Omni,—early delivery of the new ARC ADF.

DARE— VHF, Omni, 180 Channel Tranceiver.

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AERONAUTICAL PUBLICATIONS

NEW CAA EXAMS!!!! Did you know that the CAA has recently changed their exams? They are now using a new type "Open Book Exam" on some of their examinations. Obtain your CAA licenses by using a new Ross Guaranteed Questionnaire which includes the new "Open Book" type examinations. Our frequent revisions insure your receiving the latest Exams including navigation and meteorology maps. Order today: "Commercial Pilot $5.00"; "Instrument Pilot $5.00"; "Airline Transport Pilot $5.00"; "Flight Instructor $4.00"; "Private Pilot $1.00"; "Engine Mechanic $4.00"; "Aircraft Mechanic $4.00"; "Ground Instructor $5.00"; "Parachute Rigger $4.00"; "Control Tower Operator $4.00"; "New CAR for pilots 50¢." Special Limited Offer: A complete Ross Library consisting of the above 12 books for only $15.00. This introductory offer is for a limited time only, so take advantage of its savings today! Order Postpaid or C.O.D. Direct from Ross Aero Publishers, Administration Bldg., Box 7071S, Cherokee Airport, Tulsa, Oklahoma.

AVIATION SUPPLIES

FLYING SUITS, new, navy eight zipper, tan byrdcloth, $15.00 plus postage—state chest measurement and height. Navy pilot boots, sizes S, M and XL, $9.95 plus postage. D3A leather gloves with wool liners $3.75 plus postage. Flying Equipment Sales Co., Dept. S, Chicago 13, Ill.

CHARTS & MAPS

AVIATION Charts now available from our new Chart Division. Agents for the Coast and Geodetic Survey. Our service includes Aeronautical Sectional, World Aeronautical, Direction Finding, Navigational Flight, etc. Distributors for New Plastic Relief Map of the United States $45.00 express prepaid. (Free Catalog.) Pan American Navigation Service, 12021-22 Ventura Blvd,, Hollywood, Calif.

PLANES FOR SALE

EXECUTIVE LODESTAR Converted June, 1954 Corporation owned, exceptional Bendix dual radio equipment, also Sperry A12 auto pilot with approach coupler. Price $150,000. For details, contact John Trotter, 3720 Dillon St., Baltimore 24, Md.

PLANES WANTED

WANTED TO BUY: DC-3's, C-47's, C-46's. Write, wire or call with full data on aircraft and engine time and your selling price. Contact HERROL BELLOMY, Executive Vice President, L. B. Smith Aircraft Corporation, International Airport, Miami 48, Florida. Phone: NEwton 4-0611.

HELP WANTED

AIRPORT MANAGER, Portland Municipal Airport, Portland, Maine. Estimated 41,000 passengers enplaned 1956. New 5000′ runway with ILS under construction. Work includes management of terminal building, negotiation of leases and agreements, maintenance of building and field supervision of concessionaires and other contractual users of airport space and facilities. Must be able to boost airport revenue. Salary range $4,855 to $5,847 with attractive fringe benefits. Apply to Public Works Director, City Hall, Portland, Me.

POSITION WANTED

COMMERCIAL PILOT, single and multi engine land, instrument, college, 37, seeks position as company pilot or pilot salesman. Robert McCarthy, Bancroft, Iowa.

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. . . . in the business hangar

• Studebaker-Packard's DC-3 was flown into Northwestern Aeronautical Co., St. Paul, recently by chief pilot R. D. Black for a fresh paint job, engine change and minor repairs.

• Yingling Aircraft Co., Wichita, Kan., recently installed a Flite-Tronics CA-1 audio amplifier and a MB-3 marker beacon receiver in the Cessna 310 owned by Champ Flying Service, Lubbock, Tex.

• Bill Green, pilot for Ball Brothers, Muncie, Ind., recently brought the company's D18S Beechcraft to Roscoe Turner Aeronautical Corp.'s hangar in Indianapolis for installation of a ARC CD-1 course director system.

• Shell Oil's chief pilot, R. E. Porter, flew the firm's new De Havilland *Dove* to Horton and Horton Custom Works, Fort Worth, Tex., and approved styling details for the interior. The *Dove* will be based at Houston.

• Overhaul of Pratt & Whitney R985 engines, 100 hour inspection, relicense, and propeller overhaul of a Twin Beechcraft D18S were made at Roscoe Turner Aeronautical Corp. prior to delivery of the aircraft to Jack Beattie, pilot for Allen Tool Co. of Springfield, O.

• Carl Lund and George Holland of International Paper Co., landed their Lockheed *Lodestar* at Southwest Airmotive Co., Dallas, last month for an engine change and annual inspection. International Paper Co.'s NBAA representative is Gerard J. Eger.

• Atlantic Aviation Service, Inc., Wilmington, Del., recently installed a Flite-Tronics MB-3 marker beacon receiver in E. I. Du Pont's Beech E-18.

• A Flite-Tronics MB-3 marker beacon receiver was installed by Bohling Aircraft Corp. of Chicago in Gary Steel Supply's Cessna 310.

• Clyde Martin, chief pilot for Potlatch Forests, Inc., brought his *Lodestar* to Atlantic Aviation of Teterboro, N. J., for installation of the Lear single disc brake modification kit. The time element for installation was cut considerably by use of complete exchange struts. NBAA representative for Potlatch is C. W. Wellman.

• Northern Natural Gas Co. had their second executive PV-1 conversion done by Spartan Aviation Service, Tulsa. This most recent addition to Northern Natural's fleet has been completely equipped with the latest Collins equipment, including the AP-101 automatic pilot. NBAA representative for Northern is J. T. Innis.

• Pilot Oscar Williford and George Harrig, assistant director of aircraft maintenance for Gulf Oil Corp., brought one of their company's *Lodestars* to Aero Corporation, Atlanta, Ga., for X-ray of wing and empennage structure, installation of flush antennas, compliance with Lockheed Service Bulletin 18/SB-112, and miscellaneous repairs. This is the second Gulf plane to be X-rayed at Aero Corp. The entire Gulf Pittsburgh fleet is scheduled for X-ray at Aero in the near future.

• George W. Lenderman, chief pilot and NBAA representative for Radio Corporation of America, recently had the company's DC-3 into American Airmotive Corp., Miami, for installation of an RCA AVQ-10 radar, A-12 autopilot, outer wing tank, complete radio modification and 8000 hour overhaul.

• Anderson-Prichard's Oklahoma City based D-18 Beech has been completely restyled by Horton and Horton. Chief pilot Ervin E. Scott, Jr., brought the plane to Fort Worth.

• A. L. Wills, pilot for Swiflite Aircraft Corp., brought the firm's Lockheed *Lodestar* to Spartan Aviation for double engine change, accessory overhaul, and repairs to engine installation equipment. Swiflite's NBAA representative is George C. Pomeroy.

• H. C. Price Co.'s DC-3 was flown into Lear Aircraft Engineering Division recently for aileron recover and complete exterior paint job. Pilots L. L. "Pinky" MacMillan and Ed Thaggart brought the -3 to Santa Monica.

• Scripps-Howard's B-23 was in at Grand Central Aircraft Co. for a 100 hour inspection and an engine change. Chief pilot R. F. Sliker and Kenneth Hella brought the plane to Glendale, Calif.

• Fairfax Aviation, Inc., Kansas City, recently completed a Hartzell three-bladed propeller installation and unfeathering system on W&W Steele Co.'s B-50 *Bonanza.*

• Recent Bendix airborne radar installations in business DC-3's included Coca-Cola and Sears-Roebuck at Remmert-Werner in St. Louis, and Owens-Illinois and Ontario Paper Co. at Remmert-Werner in Toledo. All were X-band.

• Chamberlain Aviation, Akron, O., recently made delivery of a custom-built X band honey-comb radome to the Tennessee Gas Transmission Co. for installation on their converted Martin B-26 aircraft. NBAA representative for Tennessee Gas is Anthony Zuma.

• Tommy Monroe, chief pilot for Husky Oil Co., had his company's B-25 at Grand Central Aircraft Co., Glandale, for installation of new engines and other miscellaneous work.

• Burlington Industries' Super-92 DC-3 was at R-W Engine Works in St. Louis for a double engine change and installation of a 200 ampere generator system. Chief pilot Shelby Maxwell is NBAA representative for Burlington.

Skyways For Business

(*Continued from page* 18)

DRAMATIC, *sky-sweep Empire State lights are air-age symbol of American welcome.*

Empire State Mounts Sky-Sweeper Beacons

New York, N.Y. Don't go pulling your left foot off the rudder bar in search of a headlight dimmer button that isn't there when on a clear night in the near future, as you're cruising over Baltimore or Boston with your nose toward New York, some fellow up ahead turns his "brights" on you.

There'll be little you can do about that inconsiderate fellow up ahead for the "brights" will be the new, sky-sweeping Empire State Building lights. Erected 1,092 feet above the streets of Manhattan, the electronic tiara of four super-powerful revolving and elevating night beacons are an air-age "symbol of welcome and freedom" according to the management.

Engineered, built and installed by the Federal Sign and Signal Corp. of Chicago, the beams of light can be seen in six states, on the ground from 80 miles, and from the air are visible 300 miles. Total light output is two billion candle power, the brightest continuous man-made light source in existence.

The complex system of synchronous controls enable the beacons to revolve 180 degrees in a horizontal plane; then as each turns toward the building's television tower, they are elevated individually to sweep vertically up the tower to expose it to a brilliant path of light.

Whether the lights will endanger a pilot's night adaption vision while flying in a high-density area or will be confused with any existing navigational visual aids is not known at this time.

Beechcraft Introduces "Buy-As-You-Fly" Financing

Wichita, Kansas. Unique "buy-as-you-fly" retail financing has been introduced by Beech Aircraft Corporation. The first general-credit plan in the business airplane field to reach the customer level, it works like automobile financing. The buyer makes a down payment, takes his plane, pays it off in convenient monthly installments.